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THE

SETTING OUT OF RAILWAY CURVES.

TREATISE ON THE SETTING OUT

OF

RAILWAY CURVES,

WITH

FULL TABLES OF THE ANGLES, DISTANCES, AND OFFSETS REQUIRED:

ESPECIALLY ARRANGED FOR THE USE OF MEASUREMENTS IN FEET AND IMPERIAL LINKS, BUT ALSO ADAPTED FOR THE USE OF ANY OTHER UNIT OF MEASUREMENT.

BY

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LONDON:

E. & F. N. SPON, 48, CHARING CROSS.

NEW YORK: 446, BROOME STREET.

1873.

asportation
Library

TF
216
.L79

LONDON:
PRINTED BY VIRTUE AND CO.,
CITY ROAD.

PREFACE.

THE Author calculated the appended Tables several years ago, on, and subsequently to, his having the subject prominently before him, whilst assisting at the setting out of a section of railway over a rugged tract of country; and believing them to be of more practical utility than any he knows of having yet been published, he has been induced to publish them; having prefixed an account of those methods of ranging railway curves, for the use of which the Tables were more particularly compiled.

D. L.

November, 1872.

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THE SETTING OUT OF RAILWAY CURVES.

In laying out a new railway it is indispensable that the curved portions of it be set out with great exactness. To be able so to range out the curves of railways on all the various descriptions of country over which railways require to be made ; to be always prepared with a reliable method for prosecuting this branch of an engineer's profession, amongst the innumerable obstacles which are constantly being met with on the route of a new railway, requires on the part of those who undertake this work, a previous careful study of the methods that may be employed, and considerable tact in applying them to the best advantage on the ground. It is at once apparent that no single method of ranging curves can be applicable to all cases. Diverse circumstances necessitate the adoption of diverse methods. It is thus requisite to be prepared with the necessary data for using various systems, to be applied as best suits the peculiarities of each case ; and such data, tabulated so that it may be referred to with facility, the author in this treatise proposes to supply.

Railway curves are here assumed to be in all cases arcs of circles of a known radius, such being always adopted in practice. Attention will, therefore, be confined to the setting out of that description of curves only.

In order to be able to carry on with facility the field operations necessary for setting out railway curves, the engineer should have few or no calculations to make on the

ground. In view of this the appended tables are given, compiled in a form suitable for easy reference, from which can be got at a glance all the angles, distances, and offsets required, in a general way, for ranging all curves supposed to be ever required in the construction of railways.

In setting out the proposed route of a new railway, it is customary to mark the centre line by means of pegs fixed in the ground, at equal distances apart, along the route. The distance apart between the pegs commonly adopted is the length of a measuring chain of 100 units (in Britain either a 100-feet chain, or an imperial chain of 66 feet in length, divided into 100 links, being used). Now, as the curves of a proposed railway are generally required to be pegged out similarly with the rest of it, and in conjunction therewith, the object to be sought after in ranging them, in, we may say, every case, is *to determine points in each curve which are exactly one chain length apart as measured round it, and commencing from a given point.* The question to be dealt with thus resolves itself into one of how to find these points in practice with undoubted accuracy and the least possible trouble; and the author's purpose in the present work is to show how to obtain this result directly, aided by the use of the appended tables.

All measurements given in the tables are in units and decimals. The advantage of adopting this system is, that, although primarily each table is specially adapted for the use of measurements either in feet or imperial links, it is also applicable to the other or any unit of measurement, British or foreign; the radius of course being also reckoned by whatever unit of measurement is employed, and the angles remain the same. It may also be here observed that the tables for those curves which oftener occur in practice are given further extended than those for such curves as are supposed to be less frequently required, and that certain of those for the smaller radii are compiled for at once marking

out such curves at distances 50 units apart, as measured round the curve, as well as at the usual distance of 100 units.

The methods proposed to be used, in conjunction with the appended tables, in setting out railway curves, are the following :—

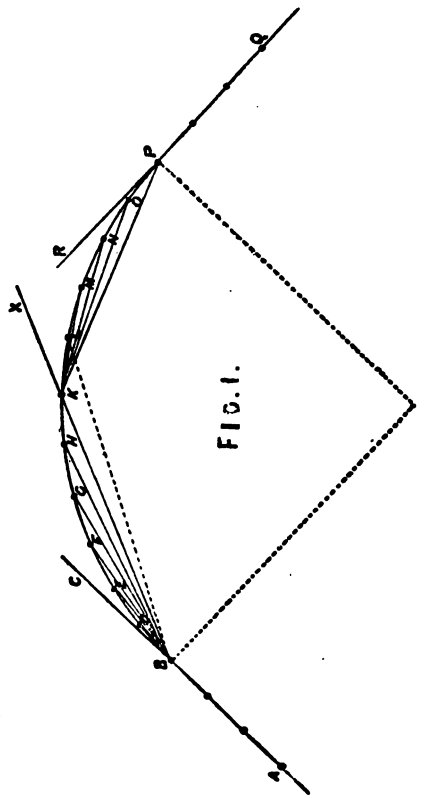
Method No. 1.

By means of Tangential Angles.—This method is, to place a theodolite over the point where the curve is required to commence, then to measure forward round the curve, and adjust the peg to be placed at end of each chain length, by means of tangential angles laid off by the theodolite ; that is, the position of each successive peg is fixed by sweeping the chain successively one length forward, curving it round till its forward end is intersected by the visual axis of the theodolite, set to a certain angle for each peg. The angles required are got without calculation, by reference to the tables (Division I.).

As an example to illustrate this method, let A B (Fig. 1) be the centre line of a straight piece of railway, and let it be required to begin a curve with a radius of 20 imperial chains (2000 links) at the point B, and range it out by pegs placed an imperial chain (100 links) apart. The curve, of course, is required to be ranged out, so that A B will be a tangent line to it. Let B C be this tangent line produced.

In the first place, let B, the commencement of the curve, coincide with a peg at a chain end in the general marking out of the line of railway. Adjust the theodolite at B. Refer now to the table applicable to the case in hand (the number of the table applicable to any particular case—for English measurements—may be always at once got from the Index at end of book), viz. Table XXV., and lay off by the theodolite, the tangential angle there given for the chord of

an arc of 100 links in length (viz. C B D = 1° 25′ 57″). Sweep the chain one length forward from B to D (using, of course, an imperial chain), and adjust the end at D till it



is intersected by the visual axis of the theodolite. The point D will be the first required point of the curve. Lay off now, by the theodolite, from B C, the tangent line produced, the

tangential angle given in Table XXV. for an arc of 200 links (C B E = 2° 51′ 53″): measure another chain length forward, from D to E, and adjust E till it is intersected by the visual axis of the theodolite. The point E will be the second required point of the curve. Lay off again by means of the theodolite, the tangential angle given in the table for an arc of 300 links (C B F = 4° 17′ 50″): measure forward as before from E to F, and determine the point F by again intersecting the visual axis of the theodolite. Lay off the angle for the next point (C B G = 5° 43′ 46″): measure forward, and fix it as formerly; and so on—say, as far as K, a distance of 6 chains from B, as measured round the curve.

It may be here remarked that the angles are extended in the tables further than it is possible to measure them in practice; but by laying them off as accurately as can be done by a theodolite, they will be correct for all practical purposes. It may likewise be observed—as, in dealing with tangential angles, it is useful to remember—that it is one of their properties to increase or diminish in regular ratio in direct proportion to the sizes of the arcs (Euclid, Book VI., Prop. XXXIII., Cor. 1). Thus, in any curve, the tangential angle formed by the chord of an arc 200 links long is exactly double that formed by the chord of an arc 100 links long; the tangential angle formed by the chord of an arc 300 links long is treble that formed by the chord of an arc 100 links long; and so on: the chord of an arc 350 links long gives a tangential angle 3½ times that given by the chord of an arc 100 links long; the chord of a 50-link arc, an angle one-half that of a 100-link arc; the chord of a 1-link arc, an angle one-hundredth part that of a 100-link arc; and in like manner the same ratio is applicable to the tangential angles of arcs of any length.

Referring again to Fig. 1: having set out the curve as far as K, it may be impossible, from the nature of the ground or some other cause, to see from B to the next

point, L. In that case remove the theodolite from B, and adjust it at K. The chord B K may be measured as a check on the work done, the length of which (viz., 597·7 links) can be got by reference to Table XXV. (600-link arc, last distance there given). The setting out can now be proceeded with from K, as formerly from B, by again sweeping the chain successively forward, and adjusting the required points, by angles laid off from the production of the chord B K. These angles are also ready to hand, being equal to those next succeeding in the table, viz., to the tangential angles for arcs 700, 800, &c., long.

This is the case, because—*In any circle the angle which the production of the chord of any arc forms with the chord of a contiguous and succeeding arc is equal to the tangential angle for an arc made up of the sum of the two arcs.* To prove this, let B F K L M (Fig. 1) be any circle, of which B K is the chord of any arc B F K, and K L the chord of any contiguous and succeeding arc K L; K X being the production of the chord B K; then the angle X K L will be equal to the angle C B L. Because, the angle X K L is equal to the two angles K L B and K B L (Euclid, Book I., Prop. XXXII.); and the angle K L B is equal to the angle C B K (Euclid, Book III., Prop. XXXII.), therefore the angle X K L is equal to the angles C B K and K B L; that is, to the angle C B L (Q.E.D.).

The following rule is, therefore, got for finding from the tables the angle which, in any curve, the production of the chord of one arc forms with the chord of the succeeding arc, viz., *add the length of the two arcs together, and take from the table the tangential angle for an arc of their united lengths.* This gives the angle sought.

Now, in the example (Fig. 1) just being treated of, the arc B F K being 600 links long, and that K L being 100 links long, and the sum of these arcs (B F K L) being thus 700 links long; the angle X K L is equal to the tangential

angle for an arc 700 links long, as formerly surmised; and on reference to Table XXV., opposite 700-link arc, the required angle (10° 1′ 36″) is at once found.

Returning now to the setting-out of the curve (Fig. 1): having adjusted the theodolite at K, and laid off by means of it the angle X K L (10° 1′ 36″), sweep the chain one length forward, from K to L, determining the position of the point L by intersecting the visual axis of the theodolite. Lay off by the theodolite the angle for the next point M, being that in the table for an 800-link arc (11° 27′ 33′): measure forward, and fix its position as before; and so on. Having continued the setting-out from K, as far as P, let it be required at that point to terminate the curve, and lay off a tangent straight line P Q. This is done as follows:— Remove the theodolite from K, and adjust it at P. Take from the table the tangential angle formed by the chord of an arc of the length of K P, in this case 5 chains (7° 9′ 43″); lay off this angle from P K, and it gives P R, the required tangent produced; reverse the theodolite, and lay off P Q, which is the line required.

Second, let B (Fig. 2), the commencement of the curve, not coincide with a peg at chain end; but be, say 45 links from last one. In this case the first required point of the curve is 55 links forward. Measure 55 links forward from B to D. Adjust the theodolite at B. Let B C be the tangent produced. The angle C B D, to be laid off by the theodolite to determine the position of point D, is found from Table XXV., in the following manner:—The arc B D is 55 links long. Take from the table the tangential angle for 50 links . . . . . 0° 42′ 58·3″

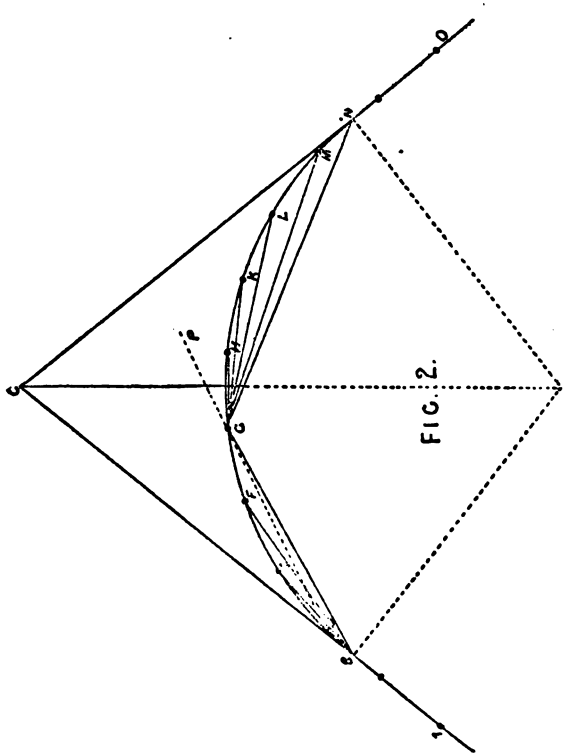
And the angle for 1 link (0° 0′ 51·57″), multiply by 5, to give the angle for 5 links . 0° 4′ 17·85″

Add these together, and the result is the tangential angle for an arc of 55 links . 0° 47′ 16·15″

Lay off then by the theodolite, the angle C B D =

0° 47′ 16·15″; sweep the chain 55 links forward, curving it round till its forward end, D, is intercepted by the visual axis of the theodolite. This gives the first required point, D, of the curve.

To proceed with the setting-out: measure a chain length,



from D to E. Retaining the theodolite at B, set it to zero, on line B D, as if that were the tangent produced. Lay off, from B D, the angle D B E, equal to the tangential angle

for an arc of 100 links, Table XXV. (1° 25′ 57″), to determine the position of the point E. The angle in the table for an arc of 2 chains (2° 51′ 53″), laid off from B D, will determine the point F; and so on.

When it is found necessary to remove the theodolite forward the curve, say to G; by adopting the production of a back-chord of an arc of whole chains in length, in this case, say D G, 3 chains, from which to lay off angles to determine the succeeding points, the angles required are got direct from the table, by rule given on page 6. Thus that (P G H) to determine the point H is the tangential angle given in the table for a 4-chain arc (5° 43′ 46″); and so on.

Let the setting out of the curve be continued from G, say for 4 chains forward, to M, and let it be required to terminate the curve at the point N, 61 links further on. The angle to be laid off at G, from D G produced, to determine the point N, is thus found from the table. To the angle which has been used to find M (Table XXV., 700-link arc) . . . . . 10° 1′ 36″

Add the angle for 61 links, which is got as follows:—

For 50 links .	0° 42′ 58·3″	
For 10 links .	0° 8′ 35·7″	
For 1 link .	0° 0′ 51·57″	
		0° 52′ 25·57″

which gives the required angle, P G N = 10° 54′ 1·57″. Lay off this angle by the theodolite; then measure 61 links from M to N, and determine the position of N, by intercepting the visual axis of the theodolite. Having thus found the point N, it is now required to lay off the tangent straight line N O. To do this, adjust the theodolite at N. Lay off, by means of it, the angle which the chord G N forms with the tangent produced, N C—that is, the angle G N C, being the tangential angle for the arc G N, which is 461 links long. This angle is found by adding to the tangential

angle for an arc of 61 links, already found .	0° 52′ 25·57″
that given in the table for an arc of 400 links	5° 43′ 46″
which gives the angle G N C = . . .	6° 36′ 11·57″

which being laid off by the theodolite, reverse the instrument and set out N O, the tangent straight line required.

When admissible on the ground it is well to produce the straight lines, A B and O N (Fig. 2), till they intersect, as at C, and measure the angle of intersection B C N; then, from this angle and the radius of the curve as data, to calculate the lengths C B and C N, measure them on the ground, and thus accurately fix the commencement and termination of the curve. This entails the necessity of the operator being provided with a set of trigonometrical tables. It is, however, especially expedient to do it, where practicable, in cases where two long, straight pieces of line require to be joined by a curve, as it admits of the two straight pieces being set out in their perfectly true direction previous to the curve being ranged.

The rule for calculating the lengths of B C and C N (Fig. 2), after the angle B C N is known, is as follows:— B C and C N are each = Radius of curve × cotangent of one-half of the angle B C N to radius unity.

Method No. 2.

By means of Angles, Chord-lines, and Offsets. — This method is to range out chords of the curve where good lines for measuring can be got on the ground; measure along such, and determine the position of the pegs by means of right-angled offsets from the chord-lines. The angles to be laid off by the theodolite, to fix the direction of the required chords, the distances on such chords from which offsets are to be raised, and the lengths of the off-sets re-

quired, are given in the appended tables (Division I.), for all curves supposed to be required on railways.

As an example of this method, let A B (Fig. 3) be a straight piece of line, and let it be required to begin a curve with a radius of 25 imperial chains (1,650 feet) at point B, and range it out by pegs placed 100 feet apart. Let B C be the tangent line A B produced.

First, let B, the commencement of the curve, coincide

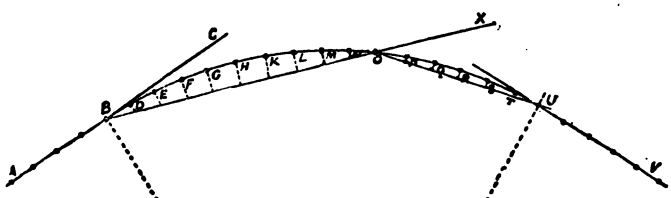


FIG 3

with a peg at a chain-end. Place the theodolite at B. Consider what length of arc it will suit best to measure the chord of—say an arc of 1,000 feet. Refer to the table applicable to this case (viz. Table LXVII.), and lay off, by means of the theodolite, at B, from B C, the tangential angle there given for the chord of a 1,000-feet arc (17° 21′ 44″); and range out the line B O X so obtained. Measure along it, and lay off, by measurements in feet, from the distances given in the table, the offsets there named. That is, at 96·29 a

right-angled offset of 26·93 gives the peg point D, exactly 100 feet from B, as measured round the curve; at 194, an offset of 47·98 gives the peg point E, exactly 200 feet from B, by measurement round the curve, and so on; at 292·9, an offset of 63·07 gives the peg point F; at 392·4, 72·15 gives G; at 492·4, 75·18 gives H; at 592·3, 72·15 gives K; at 691·9, 63·07 gives L; at 790·7, 47·98 gives M; at 888·5, 26·93 gives N; and 984·8 is the peg point O, exactly 1,000 feet from B, by measurement round the curve.

To continue the setting out of the curve from O forwards: remove the theodolite from B, and adjust it at O. Consider for what length of arc the next chord should be laid off—say for a 600-feet arc. Take from the table (LXVII.) the angle which this second chord (O U) makes with the first (B O) produced, by the rule given in Method No. 1, viz., *add the length of the two arcs together, and take from the table the tangential angle for an arc of their united lengths;* that is, in the case in hand, add 1,000 and 600, which gives 1,600 feet, the angle for which is 27° 46′ 47″. The angle X O U (Fig. 3) is thus found to be 27° 46′ 47″. Lay off this angle by the theodolite, and range out the line O U. Measure along it, laying off from the distances given in the table opposite arc 600, the offsets there stated: that is, from 98·84 an offset of 15·09 gives the peg-point P; from 198·4, 24·17 gives Q; from 298·3, 27·20 gives R; from 398·3, 24·17 gives S; from 497·9, 15·09 gives T; and 596·7 is the peg-point U, 600 feet from O, as measured round the curve.

Let it now be required to terminate the curve at U, and continue the setting out in a straight line U V. To do this, adjust the theodolite at U. Take from the table the tangential angle for an arc of the length of O U, in this case 600 feet (10° 25′ 3″); lay off this angle, by means of the theodolite, from line U O, and it will give V U produced; reverse the instrument, and set out U V, the tangent straight line required.

Second, let the commencement of the curve to be set out not coincide with a peg at a chain-end. In this case set out the odds, and adjust the first few pegs of the curve, by Method No. 1. Place the theodolite at one of the pegs thus found, and from the point, so adopted as a theodolite station, range out an offset-chord, and proceed with the setting out by Method No. 2; care being taken to take from the tables the proper angle for such chord with back chord produced, in manner explained while treating of Method No. 1.

Should it be required to terminate the curve at a point not coincident with a peg at a chain-end, it can be done, and the succeeding tangent laid off, by means of Method No. 1.

The greater part of a curve, commencing and terminating at points not coincident with chain-ends, may thus sometimes advantageously be ranged out, from one or more chords, by Method No. 2, while the two extremities are set out by Method No. 1.

Method No. 2 possesses two advantages: first, it requires the laying off of only a few angles; and second, the lines to be measured, and on which the accurate continuation of the work depends, are of considerable length; thus avoiding the liability to error adherent to other systems, where the work is prosecuted by means of a multitude of short lines measured in varying directions.

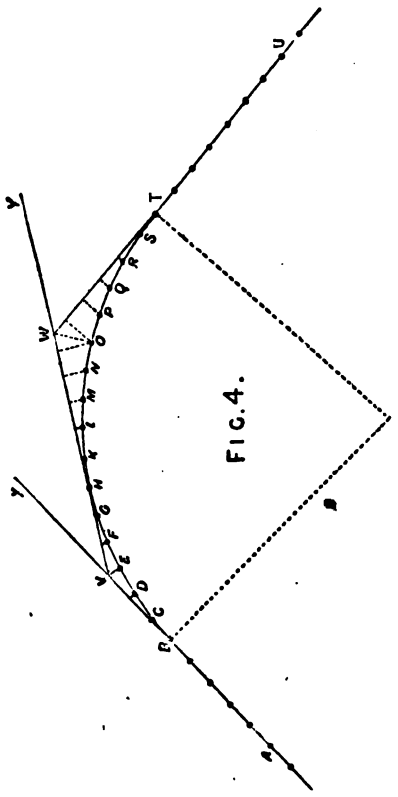
Method No. 3.

By means of Angles, Tangent-lines, and Offsets.—This method is to set out the curve by means of offsets from tangent-lines laid out round it. The angles to be laid off by the theodolite, to determine the direction of the successive tangents, the points on the tangents from which offsets are to be raised, and the lengths of such offsets, are given in the appended tables (Division II.) for curves in common use.

As an example to illustrate this method, let A B (Fig. 4) be a straight piece of line, and let it be required to commence a

curve with a radius of 30 chains (3,000 links) at point B, and stake it out by pegs placed an imperial chain apart.

First, let the curve begin and end at a peg at a chain-end,



and be an even number of chains in length—say 16. Unless when the curve is very short, it will be requisite to take it in sections, those being selected which best suit the circumstances of each case—that is, so that the tangents used may

be good lines for measurement, and the offsets necessitated may not be too long for laying off accurately. In the case in hand let it be assumed that the sections most suitable are found to be two—first a 6 and then a 10-chain arc.

Produce A B, and measure along it, using an imperial chain. Refer to the table applicable to the case, viz. Table LXXXVI. (600-link arc), for the distances and offsets required. Therefrom it is found that at 99·98 links along B V, an offset of 1·67 links gives the point C, one chain from B, by measurement round the curve; at 199·8, an offset of 6·66 gives the point D, two chains from B, as measured round the curve; at 299·5, 14·98 gives the point E, three chains from B, as measured round the curve; and at 301, as given in the table, the point V, the line is to be terminated, and a station there formed at which to adjust the theodolite. The length from V, the point of "intersection of tangents," to peg at point E, the "centre-point of arc" in hand, is, as given in the table, by figures in dark type, 15·06 links, and should be used as a check-measurement. (The distances from the points of "intersection of tangents" to the "centre-points of arcs" are put in dark type in the tables, to distinguish them from ordinary offsets; they being the only offsets in the tables which are not to be measured at right angles to some other line.) From the station at V, lay off by the theodolite, from V X, B V produced, the angle X V W—that is, the angle which the next tangent required forms with the production of the last, and which angles are given in the tables (Division II.), in the column marked "Angle at Intersection of Tangents." Thus, on referring to the table (LXXXVI.), 600-link arc, the size of the angle X V W (11° 27′ 33″) is found; and on its having been laid off, range out the line V H W in the direction determined by such angle; and measure along this line, raising offsets as stated in the table (600-link arc), viz. at 1·50 links, an offset of 14·98 gives the peg-point E, already found; at 101·1, 6·66

gives the peg-point F; at 201, 1·67 gives G; and 301 touches the curve in peg-point H; which is exactly six chains from B, by measurement round the curve.

Commence measurements anew at peg H, but still measure along V H W, to continue the setting out of the curve. Refer again to Table LXXXVI. (10-chain arc), where the distances and offsets required are found to be as follows: at 99·98, an offset of 1·67 gives peg-point K; at 199·8, 6·66 gives L; at 299·5, 14·98 gives M; at 398·8, 26·62 gives N; at 497·7, 41·56 gives O; and 504·7, at W, is the point of intersection of the tangents. Check the length from W to O, 42·15. Adjust the theodolite at W. Lay off, by means of it, the angle Y W T (19° 5′ 55″), as given in the table. Range out the line W T U. Measure along it, raising offsets as given in the table, viz. at 6·99, an offset of 41·56 gives the peg-point O, already found; at 105·9, 26·62 gives P; at 205·2, 14·98 gives Q; at 304·8, 6·66 gives R; at 404·7, 1·67 gives S; and 504·7 touches the curve in the peg-point T; which is exactly 10 chains from H, and 16 from B, by measurement round the curve. The required length of curve has now been set out. The tangent straight line from T is got by producing W T, as shown in T U.

Second, let it be required to commence and terminate the curve at points not coincident with pegs at chain-ends. In this case set out the odds, and a few chain lengths of the curve, by means of Method No. 1. Use one of the pegs thus found as a theodolite station, from which range out a tangent line, and proceed as before. The curve may likewise be terminated by means of Method No. 1.

Method No. 3 possesses similar advantages to Method No. 2, and is often applicable where No. 2 is not.

It will be observed, from the manner in which the appended tables are compiled, that great facility is afforded by them, whilst proceeding with the ranging of a curve, to change from using any one of the foregoing methods to any other of them,

as often as from time to time should be found desirable. This the author considers to be a very important point, as, not unfrequently, the method that suits well for ranging the first part of a curve does not suit well for some other portion of it, and so makes a change desirable, or even perhaps absolutely necessary. The manner of thus changing from one method to another (simply depending on the relation of the two methods to a common tangent) will be found in each case quite obvious, and will naturally suggest itself in practice.

In all cases of raising offsets, care should be taken that they are laid off at right angles to the line being measured along. A check is always afforded as to this, by testing whether the distance between the successive pegs placed measures exactly the length it ought to do.

Method No. 4.

By means of Lengths and Offsets only.—This method is to measure forward in the line of the two pegs last fixed a certain distance, and set off a certain offset, to determine the position of the next peg. The distances and offsets required for setting out by this means all curves supposed to be required on railways, are given in the tables (Division I.) opposite "Method No. 4."

This method is not recommended to be regularly used in setting out railway curves, owing to the difficulty of passing any obstruction on the ground, whilst using it; as also, that the result obtained by means of it is not sufficiently certain to be altogether depended on; for, although theoretically quite accurate, in practice it is not so, owing to the great number and shortness of the lines used, and the fact that the minute errors incident to the system, and unavoidably made along the route, accumulate as the setting out proceeds, and eventually throw the line considerably off the proper curve. The method, however, is very useful for checking purposes;

for filling in any small portion of a curve; or for adopting in minor cases, in the absence of a theodolite; and the following is an illustration of it.

Let A B (Fig. 5) be a straight piece of line, and let it be required to commence a curve at point B, with a radius of 15 imperial chains (1,500 links), and range it out by pegs placed an imperial chain apart.

Let B be a peg-point at a chain-end. Produce A B towards L. Refer to the table applicable to this case, viz. Table XX., and take therefrom the first distance and offset

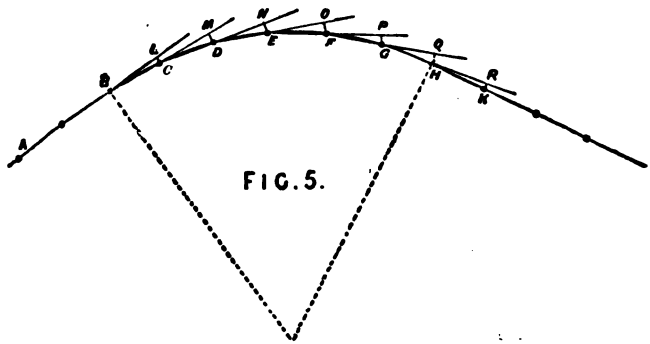


FIG. 5.

given under "Method No. 4," viz. 99·94 and 3·33. Measure B L = 99·94 links, and from L raise the right-angled offset L C = 3·33 links, and the point C, thus found, will be the first required point of the curve, and be exactly one chain length from B, as measured round the curve. Next produce B C towards M; take from the table the second distance and offset given (99·76 and 6·66), and use them as follows, viz. making C M = 99·76 links, and the right-angled offset M D = 6·66 links; and the point D, thus determined, will be the next required point of the curve, and be exactly two chain lengths from B, as measured round the curve.

Produce now C D to N; make D N equal to 99·76; raise the offset N E equal to 6·66, and the point E, thus found, is the next peg-point. In like manner set out the remaining peg-points of the curves F, G, and H, using always the second length and offset of the table, viz. 99·76 and 6·66 links.

Let it now be required to terminate the curve at point H. The direction of the succeeding tangent straight line may be thus found. Produce G H to R; make H R equal to 99·94 links, raise the offset R K equal to 3·33 links, and the point K, thus determined, is in the tangent straight line, which may then be produced as required. The curve is thus terminated by using the same length and offset with which it was commenced.

Method for Determining Intermediate Points.

If, after having ranged out a curve by determining points in it which are at regular distances of 50 or 100 units apart, it should be desired also to mark it out at closer intervals, the same may be done by stretching the chain used straight between the points already determined, and then laying off from it right-angled offsets as given in the tables (Division I.), opposite the "intermediate points" there noted.

For example, let A B C (Fig. 6) be part of a curve of a radius of two imperial chains (132 feet), the points A, B, and C of which, 100 feet apart, have been already determined; and let it be required to mark off additional points in the curve between B and C. To do this, stretch the chain straight between B and C; then refer to the table applicable to this case, viz. Table LIV.; and there, opposite "intermediate points," will be found the offsets required, viz. at 25 feet forward the curve; the offset D E to the curve, taken at right angles to B C, is 7·00 feet; at 50 feet forward, the offset F G is 9·36 feet; and at 75 feet forward, the offset H K is found to be 7·00 feet; which, when laid off, deter-

mine these intermediate points. In stretching the chain between B and C, the chord B C being less than a full

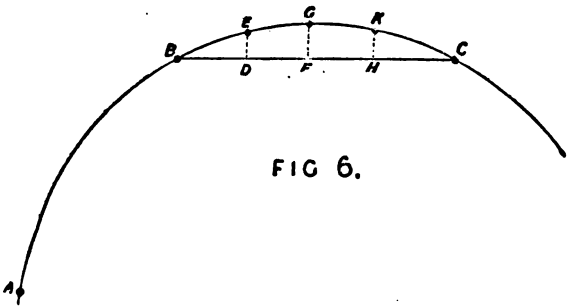


FIG 6.

chain long, the difference should be equally distributed over both ends, so that the point F, from which to raise the offset to G, may fall exactly at centre of chain. The points D and H, from which to raise the offsets to E and K respectively, will always then be very nearly 25 units from F; but these distances may, if desired, be had exactly from the tables, by taking therefrom the half of the chord of a 50-arc, to which they are equal, and which in the above example determines them (F D and F H) to be each equal to 24·85 feet.

In those tables for certain sharp curves, where the points at first determined are only 50 units apart, intermediate points are given at intervals of 10 units apart round the curve, instead of 25, as in the foregoing example. In these cases the half-chain is to be stretched as the chain was before; and then the points on it from which the offsets are to be raised may be taken at the exact tens; the theoretically true points not varying an appreciable extent from these, for any curve in the tables.

Other Methods of Ranging Curves.

On account of the practical nature of the appended tables, and the number and variety of the measurements therein given relative to the different properties and relations of curves, these tables will be found to contain data applicable for ranging curves by other methods than those just treated of, and which in exceptional circumstances it may be found necessary occasionally to adopt. Thus, for example, the angles given in Division I. of the tables are applicable to that system of ranging curves, from angles alone, by means of two theodolites placed at extremities of curve, or section of curve, to be set out, through determining the required points of the curve by the intersection of the visual-axis lines of the two theodolites, set in concert to the necessary angles. Again, in the absence of a theodolite, curves could be ranged out, with considerable expedition and accuracy, by means alone of the measurements in the tables; for instance, the first few chains of a curve could be set out by offsets from the tangent line produced; the points so found could be used for laying off, by offsets from them, the commencement of a chord-line, which, when produced, could be used in determining certain succeeding points of the curve; from which, again, the commencement of another chord-line or tangent-line could be ranged, to be produced forward as before for the purpose of setting out therefrom a succeeding section of the curve; and so on.

The author, however, considers that the instances occurring in practice in which none of the methods more particularly treated of in the foregoing pages are applicable, are very rare; so much so, that he ventures to think that these methods, of themselves, may safely be reckoned as a complete practical system of ranging railway curves, and therefore he thinks it unnecessary, for the accomplishment of his proposed object, to go further beyond them.

Tests of Accuracy.

While setting out a railway curve, it is of great advantage to have at command a large number and variety of measurements applicable to it; so that on ranging it by one method, measurements, independent of those used for determining the points, may be applied to test the accuracy of the result. The numbers of such test-measurements which can be taken from the appended tables and applied, are very many; and some should always be used from time to time, more especially while passing over difficult ground. It is, however, altogether unnecessary to particularise the test-measurements referred to; nor does the author think they need be more than thus alluded to here, as in practice those best suited to each particular case will readily suggest themselves to the engineer, in dealing with each case.

TABLES.

DIVISION I.—(CHORDS.)

For setting out, by Methods Nos. 1, 2, or 4, curves with useful radii varying

from 200 to 40,000 (which, when the unit of measurement is an imperial link, is for ranging in imperial links curves with radii from two imperial chains to five miles) . . . . . Tables I. to LIII. inclusive ; and

from 132 to 10,560 (which, when the unit of measurement is a foot, is for ranging in feet curves with radii from 132 to 10,560 feet, that is, from two imperial chains to two miles) . . . . . Tables LIV. to LXXXI. inclusive.

TABLE I. RADIUS 200. (CHORDS.)

LENGTH OF ARC.	TANGENTIAL ANGLE.		LENGTHS ROUND ARCS, WITH RIGHT-ANGLED OFFSETS (O) THERETO FROM DISTANCES (D) ON CHORDS.							
			50	100	150	200	250	300	350	400
100	14° 19′ 26″	D	49·48	98·96						
		O	6·22	0·00						
200	28° 38′ 52″	D	46·40	95·88	145·4	191·8				
		O	18·27	24·49	18·27	0·00				
300	42° 58′ 18″	D	40·44	86·84	136·3	185·8	232·2	272·6		
		O	29·18	47·45	53·67	47·45	29·18	0·00		
400	57° 17′ 44″									
500	71° 37′ 11″									
600	85° 56′ 37″									
50	7° 9′ 43·1″		49·87 length of chord.							
10	1° 25′ 56·6″		10·00 ditto.							
1	0° 8′ 35·66″		1·00 ditto.							
To intermediate points.		O	10 1·00	20 1·50	30 1·50	40 1·00				
			1st.	2nd.						
Method No. 4 . .		D	49·48	48·32						
		O	6·22	12·34						

TABLE II. RADIUS 250. (CHORDS.)

LENGTH OF ARC.	TANGENTIAL ANGLE.		LENGTHS ROUND ARCS, WITH RIGHT-ANGLED OFFSETS (O) THERETO FROM DISTANCES (D) ON CHORDS.							
			50	100	150	200	250	300	350	400
100	11° 27′ 33″	D	49·67	99·33						
		O	4·98	0·00						
200	22° 55′ 6″	D	47·69	97·36	147·0	194·7				
		O	14·75	19·73	14·75	0·00				
300	34° 22′ 38″	D	43·81	91·50	141·2	190·8	238·5	282·3		
		O	23·93	38·68	43·66	38·68	23·93	0·00		
400	45° 50′ 11″									
500	57° 17′ 44″									
600	68° 45′ 17″									
50	5° 43′ 46·4″		49·92 length of chord.							
10	1° 8′ 45·3″		10·00 ditto.							
1	0° 6′ 52·53″		1·00 ditto.							
To intermediate points.		O	10 0·80	20 1·20	30 1·20	40 0·80				
Method No. 4 . .			1st.	2nd.						
		D	49·67	48·93						
		O	4·98	9·92						

TABLE III. RADIUS 300. (CHORDS.)

LENGTH OF ARC.	TANGENTIAL ANGLE.		LENGTHS ROUND ARCS, WITH RIGHT-ANGLED OFFSETS (O) THERETO FROM DISTANCES (D) ON CHORDS.							
			50	100	150	200	250	300	350	400
100	9° 32′ 57″	D	49·77	99·54						
		O	4·16	0·0						
200	19° 5′ 55″	D	48·39	98·16	147·9	196·3				
		O	12·36	16·52	12·36	0·0				
300	28° 38′ 52″	D	45·67	94·06	143·8	193·6	242·0	287·6		
		O	20·21	32·57	36·73	32·57	20·21	0·0		
400	38° 11′ 50″	D	41·68	87·35	135·7	185·5	235·3	283·7	329·3	371·0
		O	27·51	47·72	60·08	64·24	60·08	47·72	27·51	0·0
500	47° 44′ 47″									
600	57° 17′ 44″									
50	4° 46′ 28·7″		49·94 length of chord.							
10	0° 57′ 17·7″		10·00 ditto.							
1	0° 5′ 43·77″		1·00 ditto.							
To intermediate points.			10	20	30	40				
		O	0·66	1·00	1·00	0·66				
			1st.	2nd.						
Method No. 4 . .		D	49·77	49·25						
		O	4·16	8·28						

TABLE IV. RADIUS 350. (CHORDS.)

LENGTH OF ARC.	TANGENTIAL ANGLE.		LENGTHS ROUND ARCS, WITH RIGHT-ANGLED OFFSETS (O) THERETO FROM DISTANCES (D) ON CHORDS.							
			50	100	150	200	250	300	350	400
100	8° 11′ 6″	D	49·83	99·66						
		O	3·56	0·0						
200	16° 22′ 13″	D	48·81	98·64	148·5	197·3				
		O	10·62	14·18	10·62	0·0				
300	24° 33′ 19″	D	46·80	95·61	145·4	195·3	244·1	290·9		
		O	17·46	28·08	31·64	28·08	17·46	0·0		
400	32° 44′ 25″	D	43·84	90·64	139·5	189·3	239·1	287·9	334·7	378·6
		O	23·95	41·41	52·03	55·59	52·03	41·41	23·95	0·0
500	40° 55′ 32″									
600	49° 6′ 38″									
700	57° 17′ 44″									
800	65° 28′ 51″									
50	4° 5′ 33·2″		49·96 length of chord.							
10	0° 49′ 6·6″		10·00 ditto.							
1	0° 4′ 54·66″		1·00 ditto.							
To intermediate points.			10	20	30	40				
		O	0·57	0·86	0·86	0·57				
			1st.	2nd.						
Method No. 4 . .		D	49·83	49·45						
		O	3·56	7·11						

TABLE V. RADIUS 400. (CHORDS.)

LENGTH OF ARC.	TANGENTIAL ANGLE.		LENGTHS ROUND ARCS, WITH RIGHT-ANGLED OFFSETS (O) THERETO FROM DISTANCES (D) ON CHORDS.							
			50	100	150	200	250	300	350	400
100	7° 9′ 43″	D	49·87	99·74						
		O	3·12	0·0						
200	14° 19′ 26″	D	49·09	98·96	148·8	197·9				
		O	9·31	12·43	9·31	0·0				
300	21° 29′ 9″	D	47·55	96·64	146·5	196·4	245·5	293		
		O	15·36	24·67	27·79	24·67	15·36	0·0		
400	28° 38′ 52″	D	45·26	92·81	141·9	191·8	241·6	290·7	338·3	383·5
		O	21·17	36·53	45·84	48·96	45·84	36·53	21·17	0·0
500	35° 48′ 35″									
600	42° 58′ 18″									
700	50° 8′ 1″									
800	57° 17′ 44″									
900	64° 27′ 27″									
1000	71° 37′ 11″									
50	3° 34′ 51·5″		49·97 length of chord.							
10	0° 42′ 58·3″		10·00 ditto.							
1	0° 4′ 17·83″		1·00 ditto.							
To intermediate points.			10	20	30	40				
		O	0·50	0·75	0·75	0·50				
			1st.	2nd.						
Method No. 4.		D	49·87	49·58						
		O	3·12	6·23						

TABLE VI. RADIUS 450. (CHORDS.)

LENGTH OF ARC.	TANGENTIAL ANGLE.		LENGTHS ROUND ARCS, WITH RIGHT-ANGLED OFFSETS (O) THERETO FROM DISTANCES (D) ON CHORDS.							
			50	100	150	200	250	300	350	400
100	6° 21′ 58″	D	49·90	99·79						
		O	2·77	0·0						
200	12° 43′ 57″	D	49·28	99·18	149·1	198·3				
		O	8·29	11·06	8·29	0·0				
300	19° 5′ 55″	D	48·06	97·34	147·2	197·1	246·4	294·5		
		O	13·70	21·99	24·76	21·99	13·70	0·0		
400	25° 27′ 53″	D	46·24	94·30	143·6	193·5	243·4	292·7	340·7	387
		O	18·95	32·65	40·94	43·71	40·94	32·65	18·95	0·0
500	31° 49′ 51″									
600	38° 11′ 50″									
700	44° 33′ 48″									
800	50° 55′ 46″									
900	57° 17′ 44″									
1000	63° 39′ 43″									
50	3° 10′ 59·2″		49·97 length of chord.							
10	0° 38′ 11·8″		10·00 ditto.							
1	0° 3′ 49·18″		1·00 ditto.							
To intermediate points.			10	20	30	40				
		O	0·44	0·66	0·66	0·44				
Method No. 4.			1st.	2nd.						
		D	49·90	49·66						
		O	2·77	5·54						

TABLE VII. RADIUS 500. (CHORDS.)

LENGTH OF ARC.	TANGENTIAL ANGLE.		LENGTHS ROUND ARCS, WITH RIGHT-ANGLED OFFSETS (O) THERETO FROM DISTANCES (D) ON CHORDS.							
			50	100	150	200	250	300	350	400
100	5° 43′ 46″	D	49·92	99·83						
		O	2·50	0·0						
200	11° 27′ 33″	D	49·42	99·33	149·3	198·7				
		O	7·47	9·97	7·47	0·0				
300	17° 11′ 19″	D	48·42	97·84	147·8	197·7	247·1	295·5		
		O	12·36	19·83	22·33	19·83	12·36	0·0		
400	22° 55′ 6″	D	46·95	95·37	144·8	194·7	244·6	294	342·5	389·4
		O	17·14	29·50	36·97	39·47	36·97	29·50	17·14	0·0
500	28° 38′ 52″		479·4	length of chord.						
600	34° 22′ 38″		564·6	ditto.						
700	40° 6′ 25″		644·2	ditto.						
800	45° 50′ 11″		717·4	ditto.						
900	51° 33′ 58″									
1000	57° 17′ 44″									
50	2° 51′ 53·2″		49·98	ditto.						
10	0° 34′ 22·6″		10·00	ditto.						
1	0° 3′ 26·26″		1·00	ditto.						
To intermediate points.			10	20	30	40				
		O	0·40	0.60	0·60	0·40				
Method No. 4.			1st.	2nd.						
		D	49·92	49·73						
		O	2·50	4·99						

TABLE VIII. RADIUS 550. (CHORDS.)

LENGTH OF ARC.	TANGENTIAL ANGLE.		LENGTHS ROUND ARCS, WITH RIGHT-ANGLED OFFSETS (O) THERETO FROM DISTANCES (D) ON CHORDS.							
			100	200	300	400	500	600	700	800
100	5° 12′ 31″	D	99·86							
		O	0·0							
200	10° 25′ 3″	D	99·45	198·9						
		O	9·07	0·0						
300	15° 37′ 34″	D	98·22	198·1	296·3					
		O	18·06	18·06	0·0					
400	20° 50′ 5″	D	96·17	195·6	295·1	391·2				
		O	26·90	35·97	26·90	0·0				
500	26° 2′ 37″	D	93·33	191·5	291·4	389·6	483			
		O	35·52	53·58	53·58	35·52	0·0			
600	31° 15′ 8″	D	89·72	185·9	285·3	384·8	481	570·7		
		O	43·84	70·74	79·81	70·74	43·84	0·0		
700	36° 27′ 39″									
800	41° 40′ 10″	D	80·31	170	266·2	365·7	465·1	561·3	651	731·3
		O	59·35	103·2	130·1	139·2	130·1	103·2	59·35	0·0
900	46° 52′ 42″									
1000	52° 5′ 13″									
50	2° 36′ 15·7″		49·98 length of chord.							
10	0° 31′ 15·1″		10·00 ditto.							
1	0° 3′ 7·51″		1·00 ditto.							
To intermediate points.		O	25	50	75					
			1·70	2·27	1·70					
Method No. 4.			1st.	2nd.						
		D	99·45	98·22						
		O	9·07	18·06						

TABLE IX. RADIUS **600.** (CHORDS.)

LENGTH OF ARC.	TANGENTIAL ANGLE.		LENGTHS ROUND ARCS, WITH RIGHT-ANGLED OFFSETS (O) THERETO FROM DISTANCES (D) ON CHORDS.							
			100	200	300	400	500	600	700	800
100	4° 46′ 29″	D	99·89							
		O	0·0							
200	9° 32′ 57″	D	99·54	199·1						
		O	8·31	0·0						
300	14° 19′ 26″	D	98·50	198·4	296·9					
		O	16·57	16·57	0·0					
400	19° 5′ 55″	D	96·78	196·3	295·9	392·6				
		O	24·71	33·02	24·71	0·0				
500	23° 52′ 24″	D	94·38	192·9	292·8	391·3	485·7			
		O	32·68	49·25	49·25	32·68	0·0			
600	28° 38′ 52″	D	91·34	188·1	287·7	387·2	484	575·3		
		O	40·43	65·14	73·45	65·14	40·43	0·0		
700	33° 25′ 21″									
800	38° 11′ 50″	D	83·37	174·7	271·5	371	470·6	567·4	658·7	742
		O	55·02	95·45	120·2	128·5	120·2	95·45	55·02	0·0
900	42° 58′ 18″									
1000	47° 44′ 47″									
50	2° 23′ 14·4″		49·99 length of chord.							
10	0° 28′ 38·9″		10·00 ditto.							
1	0° 2′ 51·89″		1·00 ditto.							
To intermediate points.			25	50	75					
		O	1·56	2·08	1·56					
Method No. 4.			1st.	2nd.						
		D	99·54	98·50						
		O	8·31	16·57						

TABLE X. RADIUS 650. (CHORDS.)

LENGTH OF ARC.	TANGENTIAL ANGLE.		LENGTHS ROUND ARCS, WITH RIGHT-ANGLED OFFSETS (O) THERETO FROM DISTANCES (D) ON CHORDS.							
			100	200	300	400	500	600	700	800
100	4° 24′ 27″	D	99·90							
		O	0·0							
200	8° 48′ 53″	D	99·61	199·2						
		O	7·68	0·0						
300	13° 13′ 20″	D	98·72	198·6	297·3					
		O	15·31	15·31	0·0					
400	17° 37′ 46″	D	97·25	196·9	296·5	393·7				
		O	22·85	30·53	22·85	0·0				
500	22° 2′ 13″	D	95·21	193·9	293·8	392·5	487·8			
		O	30·26	45·57	45·57	30·26	0·0			
600	26° 26′ 39″	D	92·60	189·8	289·5	389·1	486·3	578·9		
		O	37.48	60·33	68·01	60·33	37·48	0·0		
700	30° 51′ 6″									
800	35° 15′ 32″	D	85·77	178·4	275·6	375·2	474·8	572·1	664·7	750·4
		O	51·23	88·71	111·6	119·2	111·6	88·71	51·23	0·0
900	39° 39′ 59″									
1000	44° 4′ 25″									
50	2° 12′ 13·3″		49·99 length of chord.							
10	0° 26′ 26·7″		10·00 ditto.							
1	0° 2′ 38·67″		1·00 ditto.							
To intermediate points.			25	50	75					
		O	1·44	1·92	1·44					
Method No. 4.			1st.	2nd.						
		D	99·61	98·72						
		O	7·68	15·31						

TABLE XI. RADIUS 700. (CHORDS.)

LENGTH OF ARC.	TANGENTIAL ANGLE.		LENGTHS ROUND ARCS, WITH RIGHT-ANGLED OFFSETS (O) THERETO FROM DISTANCES (D) ON CHORDS.							
			100	200	300	400	500	600	700	800
100	4° 5′ 33″	D	99·91							
		O	0·0							
200	8° 11′ 6″	D	99·66	199·3						
		O	7·13	0·0						
300	12° 16′ 40″	D	98·90	198·8	297·7					
		O	14·22	14·22	0·0					
400	16° 22′ 13″	D	97·63	197·3	297	394·6				
		O	21·25	28·38	21·25	0·0				
500	20° 27′ 46″	D	95·86	194·8	294·7	393·6	489·4			
		O	28·16	42·38	42·38	28·16	0·0			
600	24° 33′ 19″	D	93·61	191·2	290·9	390·6	488·2	581·8		
		O	34·93	56·18	63·31	56·18	34·93	0·0		
700	28° 38′ 52″									
800	32° 44′ 25″	D	87·68	181·3	278·9	378·6	478·2	575·9	669·5	757·2
		O	47·90	82·83	104·1	111·2	104·1	82·83	47·90	0·0
900	36° 49′ 59″									
1000	40° 55′ 32″									
50	2° 2′ 46·6″		49·99 length of chord.							
10	0° 24′ 33·3″		10·00 ditto.							
1	0° 2′ 27·33″		1·00 ditto.							
To intermediate points.			25	50	75					
		O	1·34	1·78	1·34					
Method No. 4.			1st.	2nd.						
		D	99·66	98·90						
		O	7·13	14.22						

TABLE XII. RADIUS 750. (CHORDS.)

LENGTH OF ARC.	TANGENTIAL ANGLE.		LENGTHS ROUND ARCS, WITH RIGHT-ANGLED OFFSETS (O) THERETO FROM DISTANCES (D) ON CHORDS.							
			100	200	300	400	500	600	700	800
100	3° 49′ 11″	D	99·93							
		O	0·0							
200	7° 38′ 22″	D	99·70	199·4						
		O	6·66	0·0						
300	11° 27′ 33″	D	99·04	199	298					
		O	13·28	13·28	0·0					
400	15° 16′ 44″	D	97·93	197·6	297·3	395·3				
		O	19·85	26·51	19·85	0·0				
500	19° 5′ 55″	D	96·39	195·4	295·4	394·4	490·8			
		O	26·33	39·61	39·61	26·33	0·0			
600	22° 55′ 6″	D	94·43	192·4	292·1	391·8	489·7	584·1		
		O	32·70	52·55	59·21	52·55	32·70	0·0		
700	26° 44′ 17″									
800	30° 33′ 28″	D	89·24	183·7	281·6	381·3	481	578·9	673·4	762·6
		O	44·96	77·66	97·51	104·2	97·51	77·66	44·96	0·0
900	34° 22′ 39″									
1000	38° 11′ 50″									
50	1° 54′ 35·5″		49·99 length of chord.							
10	0° 22′ 55·1″		10·00 ditto.							
1	0° 2′ 17·51″		1·00 ditto.							
To intermediate points.		O	25 1·25	50 1·67	75 1·25					
Method No. 4.			1st.	2nd.						
		D	99·70	99·04						
		O	6·66	13·28						

TABLE XIII. RADIUS 800. (CHORDS.)

LENGTH OF ARC.	TANGENTIAL ANGLE.		LENGTHS ROUND ARCS, WITH RIGHT-ANGLED OFFSETS (O) THERETO FROM DISTANCES (D) ON CHORDS.							
			100	200	300	400	500	600	700	800
100	3° 34′ 52″	D	99·93							
		O	0·0							
200	7° 9′ 43″	D	99·74	199·5						
		O	6·24	0·0						
300	10° 44′ 35″	D	99·15	199·1	298·2					
		O	12·46	12·46	0·0					
400	14° 19′ 26″	D	98·18	197·9	297·7	395·8				
		O	18·63	24·87	18·63	0·0				
500	17° 54′ 18″	D	96·83	196	295·9	395·1	491·9			
		O	24·72	37·18	37·18	24·72	0·0			
600	21° 29′ 9″	D	95·09	193·3	293	392·8	490·9	586		
		O	30·72	49·35	55·59	49·35	30·72	0·0		
700	25° 4′ 1″									
800	28° 38′ 52″	D	90·52	185·6	283·8	383·5	483·3	581·5	676·5	767·1
		O	42·34	73·06	91·69	97·93	91·69	73·06	42·34	0·0
900	32° 13′ 44″									
1000	35° 48′ 35″									
50	1° 47′ 25·8″		49·99 length of chord.							
10	0° 21′ 29·2″		10·00 ditto.							
1	0° 2′ 8·92″		1·00 ditto.							
To intermediate points.			25	50	75					
		O	1·17	1·56	1·17					
Method No. 4.			1st.	2nd.						
		D	99·74	99·15						
		O	6·24	12·46						

TABLE XIV. RADIUS 900. (CHORDS.)

LENGTH OF ARC.	TANGENTIAL ANGLE.		LENGTHS ROUND ARCS, WITH RIGHT-ANGLED OFFSETS (O) THERETO FROM DISTANCES (D) ON CHORDS.							
			100	200	300	400	500	600	700	800
100	3° 10′ 59″	D	99·95							
		O	0·0							
200	6° 21′ 58″	D	99·80	199·6						
		O	5·55	0·0						
300	9° 32′ 58″	D	99·33	199·3	298·6					
		O	11·08	11·08	0·0					
400	12° 43′ 57″	D	98·56	198·4	298·2	396·7				
		O	16·58	22·13	16·58	0·0				
500	15° 54′ 56″	D	97·49	196·8	296·8	396·1	493·6			
		O	22·03	33·11	33·11	22·03	0·0			
600	19° 5′ 55″	D	96·12	194·7	294·5	394·3	492·8	589		
		O	27·41	43·99	49·54	43·99	27·41	0·0		
700	22° 16′ 54″									
800	25° 27′ 53″	D	92·49	188·6	287·2	387	486·8	585·3	681·5	773·9
		O	37·90	65·31	81·89	87·44	81·89	65·31	37·90	0·0
900	28° 38′ 52″									
1000	31° 49′ 51″									
50	1° 35′ 29·6″		49·99 length of chord.							
10	0° 19′ 5·9″		10·00 ditto.							
1	0° 1′ 54·59″		1·00 ditto.							
To intermediate points.		O	25 1·04	50 1·39	75 1·04					
Method No. 4.		D	1st. 99·80	2nd. 99·33						
		O	5·55	11·08						

TABLE XV. RADIUS 1000. (CHORDS.)

LENGTH OF ARC.	TANGENTIAL ANGLE.		LENGTHS ROUND ARCS, WITH RIGHT-ANGLED OFFSETS (O) THERETO FROM DISTANCES (D) ON CHORDS.									
			100	200	300	400	500	600	700	800	900	1000
100	2° 51′ 53″	D	99·96									
		O	0·0									
200	5° 43′ 46″	D	99·83	199·7								
		O	4·99	0·0								
300	8° 35′ 40″	D	99·47	199·4	298·9							
		O	9·98	9·98	0·0							
400	11° 27′ 33″	D	98·83	198·7	298·5	397·3						
		O	14·93	19·94	14·93	0·0						
500	14° 19′ 26″	D	97·96	197·5	297·4	396·8	494·8					
		O	19·86	29·84	29·84	19·86	0·0					
600	17° 11′ 19″	D	96·84	195·7	295·6	395·4	494·3	591·1				
		O	24·73	39·68	44·67	39·68	24·73	0·0				
700	20° 3′ 12″	D	95·49	193·5	292·9	392·9	492·3	590·3	685·8			
		O	29·55	49·41	59·38	59·38	49·41	29·55	0·0			
800	22° 55′ 6″	D	93·89	190·8	289·6	389·4	489·2	588	684·9	778·8		
		O	34·27	59·01	73·95	78·93	73·95	59·01	34·27	0·0		
900	25° 46′ 59″	D	92·06	187·6	285·5	385	485	584·5	682·4	777·9	870	
		O	38·93	68·48	88·33	98·30	98·30	88·33	68·48	38·93	0·0	
1000	28° 38′ 52″	D	90·00	184	280·8	379·5	479·5	579·4	678·1	774·9	868·9	958·9
		O	43·48	77·77	102·5	117·4	122·4	117·4	102·5	77·77	43·48	0·0
1100	31° 30′ 45″		1045·4	length of chord.								
1200	34° 22′ 38″		1129·3	ditto.								
1300	37° 14′ 32″		1210·5	ditto.								
1400	40° 6′ 25″		1288·1	ditto.								
1500	42° 58′ 18″		1363·2	ditto.								
1600	45° 50′ 11″		1434·6	ditto.								
1700	48° 42′ 4″		1502·8	ditto.								
1800	51° 33′ 58″		1566·7	ditto.								
1900	54° 25′ 51″		1626·8	ditto.								
2000	57° 17′ 44″		1683·0	ditto.								
50	1° 25′ 56·6″		49·994	ditto.								
10	0° 17′ 11·3″		10·00	ditto.								
1	0° 1′ 43·13″		1·00	ditto.								
To intermediate points.			25	50	75							
		O	0·94	1·25	0·94							
Method No. 4...			1st.	2nd.								
		D	99·83	99·47								
		O	4·99	9·98								

TABLE XVI. RADIUS 1100. (CHORDS.)

LENGTH OF ARC.	TANGENTIAL ANGLE.		LENGTHS ROUND ARCS, WITH RIGHT-ANGLED OFFSETS (O) THERETO FROM DISTANCES (D) ON CHORDS.									
			100	200	300	400	500	600	700	800	900	1000
100	2° 36′ 16″	D	99·96									
		O	0·0									
200	5° 12′ 31″	D	99·86	199·7								
		O	4·54	0·0								
300	7° 48′ 47″	D	99·55	199·5	299·1							
		O	9·07	9·07	0·0							
400	10° 25′ 3″	D	99·03	198·9	298·8	397·8						
		O	13·59	18·13	13·59	0·0						
500	13° 1′ 18″	D	98·32	197·9	297·8	397·4	495·7					
		O	18·07	27·14	27·14	18·07	0·0					
600	15′ 37′ 34″	D	97·39	196·4	296·3	396·1	495·2	592·6				
		O	22·52	36·11	40·65	36·11	22·52	0·0				
700	18° 13′ 49″											
800	20° 50′ 5″	D	94·95	192·3	291·4	391·2	491·1	590·1	687·5	782·5		
		O	31·27	53·79	67·38	71·92	67·38	53·79	31·27	0·0		
900	23° 26′ 21″											
1000	26° 2′ 36″	D	91·72	186·7	284·1	383·1	483	582·8	681·8	779·2	874·2	965·9
		O	39·76	71·03	93·55	107·1	111·7	107·1	93·55	71·03	39·76	0·0
50	1° 18′ 7·8″		50·00	length of chord.								
10	0° 15′ 37·6″		10·00	ditto.								
1	0° 1′ 33·76″		1·00	ditto.								
To intermediate points.		O	25 0·85	50 1·14	75 0·85							
Method No. 4...		D	1st. 99·86	2nd. 99·55								
		O	4·54	9·07								

TABLE XVII. RADIUS 1200. (CHORDS.)

LENGTH OF ARC.	TANGENTIAL ANGLE.		LENGTHS ROUND ARCS, WITH RIGHT-ANGLED OFFSETS (O) THERETO FROM DISTANCES (D) ON CHORDS.									
			100	200	300	400	500	600	700	800	900	1000
100	2° 23′ 14″	D	99·97									
		O	0·0									
200	4° 46′ 29″	D	99·88	199·8								
		O	4·16	0·0								
300	7° 9′ 43″	D	99·62	199·6	299·2							
		O	8·32	8·32	0·0							
400	9° 32′ 57″	D	99·19	199·1	299	398·2						
		O	12·46	16·62	12·46	0·0						
500	11° 56′ 12″	D	98·58	198·2	298·2	397·8	496·4					
		O	16·58	24·90	24·90	16·58	0·0					
600	14° 19′ 26″	D	97·81	197	296·9	396·8	496	593·8				
		O	20·68	33·14	37·30	33·14	20·68	0·0				
700	16° 42′ 40″	D	96·86	195·4	295·1	395	494·7	593·2	690·1			
		O	24·73	41·31	49·63	49·63	41·31	24·73	0·0			
800	19° 5′ 55″	D	95·75	193·6	292·8	392·6	492·5	591·7	689·5	785·3		
		O	28·75	49·43	61·89	66·05	61·89	49·43	28·75	0·0		
900	21° 29′ 9″	D	94·47	191·3	289·9	389·5	489·5	589·1	687·7	784·6	879	
		O	32·71	57·44	74·02	82·34	82·34	74·02	57·44	32·71	0·0	
1000	23° 52′ 23″	D	93·02	188·8	286·6	385·8	485·7	585·5	684·7	782·5	878·3	971·3
		O	36·62	65·37	86·05	98·51	102·7	98·51	86·05	65·37	36·62	0·0
50	1° 11′ 37·2″		50·00	length of chord.								
10	0° 14′ 19·4″		10·00	ditto.								
1	0° 1′ 25·94″		1·00	ditto.								
To intermediate points.			25	50	75							
		O	0·78	1·04	0·78							
Method No. 4...			1st.	2nd.								
		D	99·88	99·62								
		O	4·16	8·32								

TABLE XVIII. RADIUS 1300. (CHORDS.)

LENGTH OF ARC.	TANGENTIAL ANGLE.	LENGTHS ROUND ARCS, WITH RIGHT-ANGLED OFFSETS (O) THERETO FROM DISTANCES (D) ON CHORDS.										
			100	200	300	400	500	600	700	800	900	1000
100	2° 12′ 13″	D	99·97									
		O	0·0									
200	4° 24′ 26″	D	99·90	199·8								
		O	3·84	0·0								
300	6° 36′ 40″	D	99·68	199·7	299·3							
		O	7·68	7·68	0·0							
400	8° 48′ 53″	D	99·31	199·2	299·1	398·4						
		O	11·50	15·34	11·50	0·0						
500	11° 1′ 6″	D	98·79	198·5	298·4	398·1	496·9					
		O	15·32	23·00	23·00	15·32	0·0					
600	13° 13′ 19″	D	98·13	197·4	297·3	397·2	496·5	594·7				
		O	19·11	30·61	34·45	30·61	19·11	0·0				
700	15° 25′ 33″											
800	17° 37′ 46″	D	96·37	194·5	293·8	393·7	493·6	592·9	691	787·4		
		O	26·59	45·70	57·20	61·04	57·20	45·70	26·59	0·0		
900	19° 49′ 59″											
1000	22° 2′ 12″	D	94·04	190·4	288·5	387·8	487·7	587·6	687	785·1	881·5	975·5
		O	33·92	60·51	79·62	91·12	94·96	91·12	79·62	60·51	33·92	0·0
50	1° 6′ 6·6″		50·00	length of chord.								
10	0° 13′ 13·3″		10·00	ditto.								
1	0° 1′ 19·33″		1·00	ditto.								
To intermediate points.		O	25 0·72	50 0·96	75 0·72							
Method No. 4...			1st.	2nd.								
		D	99·90	99·68								
		O	3·84	7·68								

TABLE XIX. RADIUS 1400. (CHORDS.)

LENGTH OF ARC.	TANGENTIAL ANGLE.		LENGTHS ROUND ARCS, WITH RIGHT-ANGLED OFFSETS (O) THERETO FROM DISTANCES (D) ON CHORDS.									
			100	200	300	400	500	600	700	800	900	1000
100	2° 2′ 47″	D	99·98									
		O	0·0									
200	4° 5′ 33″	D	99·91	199·8								
		O	3·57	0·0								
300	6° 8′ 20″	D	99·72	199·7	299·4							
		O	7·14	7·14	0·0							
400	8° 11′ 6″	D	99·40	199·3	299·2	398·6						
		O	10·70	14·27	10·70	0·0						
500	10° 13′ 53″	D	98·96	198·7	298·7	398·4	497·3					
		O	14·23	21·37	21·37	14·23	0·0					
600	12° 16′ 40″	D	98·39	197·8	297·7	397·6	497	595·4				
		O	17·76	28·46	32·03	28·46	17·76	0·0				
700	14° 19′ 26″											
800	16° 22′ 13″	D	96·87	195·3	294·7	394·6	494·5	593·9	692·3	789·2		
		O	24·73	42·49	53·19	56·76	53·19	42·49	24·73	0·0		
900	18° 24′ 59″											
1000	20° 27′ 46″	D	94·86	191·7	290·1	389·5	489·4	589·3	688·7	787·1	884	978·9
		O	31·58	56·31	74·07	84·77	88·34	84·77	74·07	56·31	31·58	0·0
50	1° 1′ 23·3″		50·00	length of chord.								
10	0° 12′ 16·7″		10·00	ditto.								
1	0° 1′ 13·67″		1·00	ditto.								
To intermediate points.		O	25	50	75							
			0·67	0·89	0·67							
Method No. 4....			1st.	2nd.								
		D	99·91	99·72								
		O	3·57	7·14								

TABLE XX. RADIUS 1500. (CHORDS.)

LENGTH OF ARC.	TANGENTIAL ANGLE.		LENGTHS ROUND ARCS, WITH RIGHT-ANGLED OFFSETS (O) THERETO FROM DISTANCES (D) ON CHORDS.									
			100	200	300	400	500	600	700	800	900	1000
100	1° 54′ 35″	D	99·98									
		O	0·0									
200	3° 49′ 11″	D	99·94	199·8								
		O	3·33	0·0								
300	5° 43′ 46″	D	99·76	199·7	299·5							
		O	6·66	6·66	0·0							
400	7° 38′ 22″	D	99·48	199·4	299·4	398·8						
		O	9·98	13·31	9·98	0·0						
500	9° 32′ 57″	D	99·09	198·9	298·8	398·6	497·7					
		O	13·29	19·85	19·85	13·29	0·0					
600	11° 27′ 33″	D	98·60	198·1	298	398	497·4	596				
		O	16·59	26·57	29·90	26·57	16·59	0·0				
700	13° 22′ 8″	D	97·99	197·1	296·8	396·8	496·6	595·7	693·7			
		O	19·86	33·15	39·81	39·81	33·15	19·86	0·0			
800	15° 16′ 44″	D	97·27	195·9	295·4	395·3	495·2	594·7	693·3	790·6		
		O	23·12	39·71	49·69	53·02	49·69	39·71	23·12	0·0		
900	17° 11′ 19″	D	96·45	194·4	293·5	393·3	493·3	593	692·1	790·1	886·6	
		O	26·35	46·21	59·50	66·16	66·16	59·50	46·21	26·35	0·0	
1000	19° 5′ 55″	D	95·52	192·8	291·4	390·9	490·8	590·7	690·2	788·8	886·1	981·6
		O	29·55	52·67	69·26	79·24	82·57	79·24	69·26	52·67	29·55	0·0
1100	21° 0′ 30″		1075·5	length of chord.								
1200	22° 55′ 6″		1168·2	ditto.								
1300	24° 49′ 41″		1259·7	ditto.								
1400	26° 44′ 17″		1349·7	ditto.								
1500	28° 38′ 52″		1438·3	ditto.								
1600	30° 33′ 28″		1525·2	ditto.								
1700	32° 28′ 3″		1610·5	ditto.								
1800	34° 22′ 39″		1693·9	ditto.								
1900	36° 17′ 14″		1775·5	ditto.								
2000	38° 11′ 50″		1855·1	ditto.								
50	0° 57′ 17·7″		50·00	ditto.								
10	0° 11′ 27·5″		10·00	ditto.								
1	0° 1′ 8·75″		1·00	ditto.								
To intermediate points.		O	25 0·62	50 0·83	75 0·62							
Method No. 4....			1st.	2nd.								
		D	99·94	99·76								
		O	3·33	6·66								

TABLE XXI. RADIUS 1600. (CHORDS.)

LENGTH OF ARC.	TANGENTIAL ANGLE.		LENGTHS ROUND ARCS, WITH RIGHT-ANGLED OFFSETS (O) THERETO FROM DISTANCES (D) ON CHORDS.									
			100	200	300	400	500	600	700	800	900	1000
100	1° 47′ 26″	D	99·98									
		O	0·0									
200	3° 34′ 52″	D	99·94	199·9								
		O	3·12	0,0								
300	5° 22′ 17″	D	99·79	199·8	299·6							
		O	6·24	6·24	0·0							
400	7° 9′ 43″	D	99·54	199·5	299·4	399						
		O	9·36	12·48	9·36	0·0						
500	8° 57′ 9″	D	99·20	199	299	398·8	498					
		O	12·47	18·71	18·71	12·47	0·0					
600	10° 44′ 35″	D	98·77	198·3	298·2	398·2	497·7	596·5				
		O	15·56	24·92	28·04	24·92	15·56	0·0				
700	12° 32′ 0″											
800	14° 19′ 26″	D	97·60	196·4	295·9	395·8	495·8	595·3	694·1	791·7		
		O	21·70	37·26	46·62	49·74	46·62	37·26	21·70	0·0		
900	16° 6′ 52″											
1000	17° 54′ 18″	D	96·05	193·7	292·4	392	491·9	591·8	691·4	790·2	887·8	983·8
		O	27·75	49·45	65·01	74·37	77·49	74·37	65·01	49·45	27·75	0·0
50	0° 53′ 42·9″		50·00	length of chord.								
10	0° 10′ 44·6″		10·00		ditto							
1	0° 1′ 4·46″		1·00		ditto							
To intermediate points.		O	25 0·58	50 0·78	75 0·58							
Method No. 4...			1st.	2nd.								
		D	99·94	99·79								
		O	3·12	6·24								

TABLE XXII. RADIUS 1700. (CHORDS.)

LENGTH OF ARC.	TANGENTIAL ANGLE.		LENGTHS ROUND ARCS, WITH RIGHT-ANGLED OFFSETS (O) THERETO FROM DISTANCES (D) ON CHORDS.									
			100	200	300	400	500	600	700	800	900	1000
100	1° 41′ 7″	D	99·99									
		O	0·0									
200	3° 22′ 13″	D	99·94	199·9								
		O	2·94	0·0								
300	5° 3′ 20″	D	99·81	199·8	299·6							
		O	5·88	5·88	0·0							
400	6° 44′ 26″	D	99·60	199·5	299·5	399·1						
		O	8·79	11·73	8·79	0·0						
500	8° 25′ 33″	D	99·29	199·1	299·1	398·9	498·2					
		O	11·74	17·62	17·62	11·74	0·0					
600	10° 6′ 40″	D	98·91	198·5	298·5	398·4	498	596·9				
		O	14·65	23·44	26·38	23·44	14·65	0·0				
700	11° 47′ 46″											
800	13° 28′ 53″	D	97·87	196·8	296·4	396·3	496·3	595·9	694·8	792·6		
		O	20·44	35·09	43·88	46·82	43·88	35·09	20·44	0·0		
900	15° 9′ 59″											
1000	16° 51′ 6″	D	96·50	194·4	293·3	392·9	492·8	592·8	692·4	791·3	889·2	985·6
		O	26·16	46·60	61·25	70·04	72·98	70·04	61·25	46·60	26·16	0·0
50	0° 50′ 33·3″		50·00	length of chord.								
10	0° 10′ 6·7″		10·00	ditto.								
1	0° 1′ 0·67″		1·00	ditto.								
To intermediate points.		O	25 0·55	50 0·73	75 0·55							
Method No. 4....		D	1st. 99·94	2nd. 99·81								
		O	2·94	5·88								

TABLE XXIII. RADIUS 1800. (CHORDS.)

LENGTH OF ARC.	TANGENTIAL ANGLE.		LENGTHS ROUND ARCS, WITH RIGHT-ANGLED OFFSETS (O) THERETO FROM DISTANCES (D) ON CHORDS.									
			100	200	300	400	500	600	700	800	900	1000
100	1° 35′ 30″	D	99·99									
		O	0·0									
200	3° 10′ 59″	D	99·95	199·9								
		O	2·78	0·0								
300	4° 46′ 29″	D	99·83	199·8	299·7							
		O	5·55	5·55	0·0							
400	6° 21′ 58″	D	99·64	199·6	299·5	399·2						
		O	8·32	11·10	8·32	0·0						
500	7° 57′ 28″	D	99·37	199·2	299·2	399	498·4					
		O	11·09	16·64	16·64	11·09	0·0					
600	9° 32′ 57″	D	99·02	198·7	298·6	398·6	498·2	597·3				
		O	13·84	22·16	24·94	22·16	13·84	0·0				
700	11° 8′ 27″											
800	12° 43′ 57″	D	98·10	197·1	296·8	396·7	496·7	596·3	695·3	793·4		
		O	19·32	33·16	41·48	44·26	41·48	33·16	19·32	0·0		
900	14° 19′ 26″											
1000	15° 54′ 56″	D	96·88	195	294	393·6	493·6	593·5	693·2	792·2	890·3	987·2
		O	24·74	44·06	57·90	66·22	69·00	66·22	57·90	44·06	24·74	0·0
50	0° 47′ 44·8″		50·00	length of chord.								
10	0° 9′ 33·0″		10·00	ditto.								
1	0° 0′ 57·30″		1·00	ditto.								
To intermediate points.		O	25 0·52	50 0·70	75 0·52							
Method No. 4....		D	1st. 99·95	2nd. 99·83								
		O	2·78	5·55								

TABLE XXIV. RADIUS 1900. (CHORDS.)

LENGTH OF ARC.	TANGENTIAL ANGLE.		LENGTHS ROUND ARCS, WITH RIGHT-ANGLED OFFSETS (O) THERETO FROM DISTANCES (D) ON CHORDS.									
			100	200	300	400	500	600	700	800	900	1000
100	1° 30′ 28″	D	99·99									
		O	0·0									
200	3° 0′ 56″	D	99·95	199·9								
		O	2·63	0·0								
300	4° 31′ 24″	D	99·85	199·8	299·7							
		O	5·26	5·26	0·0							
400	6° 1′ 52″	D	99·68	199·6	299·6	399·3						
		O	7·89	10·52	7·89	0·0						
500	7° 32′ 20″	D	99·44	199·3	299·3	399·1	498·6					
		O	10·50	15·76	15·76	10·50	0·0					
600	9° 2′ 48″	D	99·12	198·8	298·7	398·7	498·4	597·5				
		O	13·12	21·01	23·64	21·01	13·12	0·0				
700	10° 33′ 16″											
800	12° 3′ 44″	D	98·30	197·4	297·1	397	497	596·7	695·8	794·1		
		O	18·31	31·43	39·32	41·95	39·32	31·43	18·31	0·0		
900	13° 34′ 12″											
1000	15° 4′ 40″	D	97·20	195·5	294·6	394·3	494·2	594·2	693·9	793	891·3	988·5
		O	23·46	41·77	54·89	62·78	65·41	62·78	54·89	41·77	23·46	0·0
50	0° 45′ 14″		50·00	length of chord.								
10	0° 9′ 2·8″		10·00	ditto.								
1	0° 0′ 54·28″		1·00	ditto.								
To intermediate points.			25	50	75							
		O	0·50	0·66	0·50							
Method No. 4....			1st.	2nd.								
		D	99·95	99·85								
		O	2·63	5·26								

TABLE XXV. RADIUS 2000. (CHORDS.)

LENGTH OF ARC.	TANGENTIAL ANGLE.		LENGTHS ROUND ARCS, WITH RIGHT-ANGLED OFFSETS (O) THERETO FROM DISTANCES (D) ON CHORDS.											
			100	200	300	400	500	600	700	800	900	1000	1100	120
100	1° 25′ 57″	D	99·99											
		O	0·00											
200	2° 51′ 53″	D	99·96	199·9										
		O	2·50	0·00										
300	4° 17′ 50″	D	99·86	199·8	299·7									
		O	5·00	5·00	0·00									
400	5° 43′ 46″	D	99·71	199·6	299·6	399·3								
		O	7·49	9·99	7·49	0·00								
500	7° 9′ 43″	D	99·49	199·4	299·4	399·2	498·7							
		O	9·98	14·98	14·98	9·98	0·00							
600	8° 35′ 40″	D	99·20	198·9	298·9	398·8	498·5	597·7						
		O	12·47	19·97	22·47	19·97	12·47	0·00						
700	10° 1′ 36″	D	98·86	198·3	298·2	398·2	498·1	597·5	696·4					
		O	14·93	24·93	29·92	29·92	24·93	14·93	0·00					
800	11° 27′ 33″	D	98·45	197·7	297·4	397·3	497·3	597	696·2	794·7				
		O	17·41	29·88	37·37	39·87	37·37	29·88	17·41	0·00				
900	12° 53′ 29″	D	98·00	196·9	296·4	396·2	496·2	596	695·5	794·4	892·4			
		O	19·86	34·79	44·77	49·77	49·77	44·77	34·79	19·86	0·00			
1000	14° 19′ 26″	C	97·47	195·9	295·1	394·8	494·8	594·8	694·5	793·7	892·1	989·6		
		O	22·31	39·72	52·19	59·68	62·18	59·68	52·19	39·72	22·31	0·00		
1100	15° 45′ 23″	D	96·89	194·9	293·7	393·2	493·1	593·1	693	792·4	891·3	989·3	1086·2	
		O	24·74	44·60	59·53	69·51	74·51	74·51	69·51	59·53	44·60	24·74	0·00	
1200	17° 11′ 19″	D	96·21	193·7	292·1	391·3	491	591	691	790·7	889·9	988·3	1085·8	118
		O	27·15	49·46	66·87	79·34	86·83	89·33	86·83	79·34	66·87	49·46	27·15	0·0
1300	18° 37′ 16″		1277·2 length of chord.											
1400	20° 3′ 12″		1371·6 ditto.											
1500	21° 29′ 9″		1465·0 ditto.											
1600	22° 55′ 6″		1557·7 ditto.											
1700	24° 21′ 2″		1649·3 ditto.											
1800	25° 46′ 59″		1740·0 ditto.											
1900	27° 12′ 55″		1829·2 ditto.											
2000	28° 38′ 52″		1917·7 ditto.											
50	0° 42′ 58·3″		50·00 ditto.											
10	0° 8′ 35·7″		10·00 ditto.											
1	0° 0′ 51·57″		1·00 ditto.											
To intermediate points.			25	50	75									
		O	0·47	0·62	0·47									
			1st.	2nd.										
Method No. 4....		D	99·96	99·86										
		O	2·50	5·00										

TABLE XXVI. RADIUS 2100. (CHORDS.)

LENGTH OF ARC.	TANGENTIAL ANGLE.		LENGTHS ROUND ARCS, WITH RIGHT-ANGLED OFFSETS (O) THERETO FROM DISTANCES (D) ON CHORDS.									
			100	200	300	400	500	600	700	800	900	1000
100	1° 21′ 51″	D	99·99									
		O	0·0									
200	2° 43′ 42″	D	99·96	199·9								
		O	2·38	0·0								
300	4° 5′ 33″	D	99·88	199·9	299·8							
		O	4·76	4·76	0·0							
400	5° 27′ 24″	D	99·74	199·7	299·7	399·4						
		O	7·13	9·51	7·13	0·0						
500	6° 49′ 15″	D	99·53	199·4	299·4	399·3	498·8					
		O	9·50	14·26	14·26	9·50	0·0					
600	8° 11′ 6″	D	99·27	199	299	398·9	498·7	597·9				
		O	11·86	18·99	21·37	18·99	11·86	0·0				
700	9° 32′ 57″											
800	10° 54′ 49″	D	98·61	197·9	297·6	397·6	497·5	597·3	696·6	795·2		
		O	16·59	28·45	35·58	37·96	35·58	28·45	16·59	0·0		
900	12° 16′ 40″											
1000	13° 38′ 31″	D	97·70	196·3	295·6	395·3	495·3	595·2	695	794·3	892·9	990·5
		O	21·26	37·85	49·71	56·84	59·22	56·84	49·71	37·85	21·26	0·0
50	0° 40′ 55·6″		50·00 length of chord.									
10	0° 8′ 11·11″		10·00 ditto.									
1	0° 0′ 49·11″		1·00 ditto.									
To intermediate points.		O	25 0·45	50 0·60	75 0·45							
Method No. 4....			1st.	2nd.								
		D	99·96	99·88								
		O	2·38	4·76								

TABLE XXVII. RADIUS 2200. (CHORDS.)

LENGTH OF ARC.	TANGENTIAL ANGLE.		LENGTHS ROUND ARCS, WITH RIGHT-ANGLED OFFSETS (O) THERETO FROM DISTANCES (D) ON CHORDS.									
			100	200	300	400	500	600	700	800	900	10
100	1° 18′ 8″	D	99·99									
		O	0·0									
200	2° 36′ 16″	D	99·97	199·9								
		O	2·27	0·0								
300	3° 54′ 23″	D	99·89	199·9	299·8							
		O	4·54	4·54	0·0							
400	5° 12′ 31″	D	99·76	199·7	299·7	399·5						
		O	6·81	9·08	6·81	0·0						
500	6° 30′ 39″	D	99·57	199·5	299·5	399·3	498·9					
		O	9·07	13·61	13·61	9·07	0·0					
600	7° 48′ 47″	D	99·33	199·1	299·1	399	498·8	598·1				
		O	11·32	18·13	20·40	18·13	11·32	0·0				
700	9° 6′ 55″											
800	10° 25′ 3″	D	98·73	198·1	297·8	397·8	497·8	597·5	696·9	795·6		
		O	15·84	27·16	33·97	36·24	33·97	27·16	15·84	0·0		
900	11° 43′ 10″											
1000	13° 1′ 18″	D	97·91	196·6	296	395·7	495·7	595·7	695·4	794·8	893·5	991
		O	20·31	36·15	47·47	54·28	56·55	54·28	47·47	36·15	20·31	0·
50	0° 39′ 3·9″		50·00	length of chord.								
10	0° 7′ 48·8″		10·00	ditto.								
1	0° 0′ 46·88″		1·00	ditto.								
To intermediate points.		O	25 0·43	50 0·57	75 0·43							
Method No. 4....			1st.	2nd.								
		D	99·97	99·89								
		O	2·27	4·54								

TABLE XXVIII. RADIUS **2300.** (CHORDS.)

LENGTH OF ARC.	TANGENTIAL ANGLE.		LENGTHS ROUND ARCS, WITH RIGHT-ANGLED OFFSETS (O) THERETO FROM DISTANCES (D) ON CHORDS.									
			100	200	300	400	500	600	700	800	900	1000
100	1° 14′ 44″	D	99·99									
		O	0·0									
200	2° 29′ 28″	D	99·97	199·9								
		O	2·17	0·0								
300	3° 44′ 12″	D	99·90	199·9	299·8							
		O	4·34	4·34	0·0							
400	4° 58′ 56″	D	99·78	199·8	299·7	399·5						
		O	6·51	8·68	6·51	0·0						
500	6° 13′ 40″	D	99·61	199·5	299·5	399·4	499					
		O	8·68	13·02	13·02	8·68	0·0					
600	7° 28′ 24″	D	99·40	199·2	299·1	399·1	498·9	598·3				
		O	10·85	17·36	19·53	17·36	10·85	0·0				
700	8° 43′ 8″											
800	9° 57′ 52″	D	98·83	198·2	298	398	498	597·7	697·1	795·9		
		O	15·16	26·01	32·52	34·69	32·52	26·01	15·16	0·0		
900	11° 12′ 36″											
1000	12° 27′ 20″	D	98·08	196·9	296·3	396·1	496·1	596	695·8	795·2	894	992·1
		O	19·44	34·60	45·45	51·96	54·13	51·96	45·45	34·60	19·44	0·0
50	0° 37′ 22″		50·00 length of chord.									
10	0° 7′ 28·4″		10·00 ditto.									
1	0° 0′ 44·84″		1·00 ditto.									
To intermediate points.		O	25 0·40	50 0·54	75 0·40							
Method No. 4....			1st.	2nd.								
		D	99·97	99·90								
		O	2·17	4·34								

TABLE XXIX. RADIUS 2400. (CHORDS.)

LENGTH OF ARC.	TANGENTIAL ANGLE.		LENGTHS ROUND ARCS, WITH RIGHT-ANGLED OFFSETS (O) THERETO FROM DISTANCES (D) ON CHORDS.									
			100	200	300	400	500	600	700	800	900	10
100	1° 11′ 37″	D	99·99									
		O	0·0									
200	2° 23′ 14°	D	99·97	199·9								
		O	2·08	0·0								
300	3° 34′ 51″	D	99·90	199·9	299·8							
		O	4·16	4·16	0·0							
400	4° 46′ 29″	D	99·80	199·8	299·7	399·6						
		O	6·24	8·32	6·24	0·0						
500	5° 58° 6″	D	99·64	199·5	299·5	399·4	499·1					
		O	8·32	12·48	12·48	8·32	0·0					
600	7° 9′ 43″	D	99·43	199·2	299·2	399·2	499	598·4				
		O	10·39	16·63	18·71	16·63	10·39	0·0				
700	8° 21′ 20″											
800	9° 32′ 57″	D	98·93	198·4	298·2	398·1	498·1	597·9	697·3	796·2		
		O	14·53	24·92	31·16	33·24	31·16	24·92	14·53	0·0		
900	10° 44′ 35″											
1000	11° 56′ 12″	D	98·24	197·2	296·6	396·4	496·4	596·3	696·1	795·6	894·5	992
		O	18·64	33·17	43·56	49·80	51·88	49·80	43·56	33·17	18·64	0·
50	0° 35′ 48·6″		50·00	length of chord.								
10	0° 7′ 9·7″		10·00	ditto.								
1	0° 0′ 42·97″		1·00	ditto.								
To intermediate points.		O	25 0·39	50 0·52	75 0·39							
Method No. 4....		D	1st. 99·97	2nd. 99·90								
		O	2·08	4·16								

TABLE XXX. RADIUS 2500. (CHORDS.)

LENGTH OF ARC.	TANGENTIAL ANGLE.		LENGTHS ROUND ARCS, WITH RIGHT-ANGLED OFFSETS (O) THERETO FROM DISTANCES (D) ON CHORDS.											
			100	200	300	400	500	600	700	800	900	1000	1100	1200
100	1° 8′ 45″	D	99·99											
		O	0·0											
200	2° 17′ 31″	D	99·97	199·9										
		O	2·00	0·0										
300	3° 26′ 16″	D	99·91	199·9	299·8									
		O	4·00	4·00	0·0									
400	4° 35′ 1″	D	99·81	199·8	299·8	399·6								
		O	6·00	8·00	6·00	0·0								
500	5° 43′ 46″	D	99·67	199·6	299·6	399·5	499·2							
		O	7·99	11·99	11·99	7·99	0·0							
600	6° 52′ 32″	D	99·50	199·3	299·3	399·3	499·1	598·6						
		O	9·98	15·98	17·98	15·98	9·98	0·0						
700	8° 1′ 17″	D	99·27	198·9	298·8	398·8	498·8	598·4	697·7					
		O	11·97	19·96	23·96	23·96	19·96	11·97	0·0					
800	9° 10′ 2″	D	99·01	198·5	298·3	398·3	498·3	598·1	697·6	796·6				
		O	13·95	23·93	29·93	31·93	29·93	23·93	13·95	0·0				
900	10° 18′ 48″	D	98·71	198	297·6	397·6	497·6	597·5	697·1	796·4	895·1			
		O	15·92	27·89	35·88	39·88	39·88	35·88	27·89	15·92	0·0			
1000	11° 27′ 33″	D	98·38	197·4	296·9	396·7	496·7	596·6	696·5	796	895	993·3		
		O	17·90	31·85	41·83	47·83	49·83	47·83	41·83	31·85	17·90	0·0		
1100	12° 36′ 18″	D	98·00	196·7	296	395·6	495·6	595·6	695·5	795·1	894·4	993·1	1091·1	
		O	19·87	35·79	47·76	55·75	59·75	59·75	55·75	47·76	35·79	19·87	0·0	
1200	13° 45′ 3″	D	97·58	196	295	394·5	494·3	594·3	694·2	794	893·5	992·5	1090·9	1188·5
		O	21·82	39·72	53·67	63·65	69·65	71·65	69·65	63·65	53·67	39·72	21·82	0.0
1300	14° 53′ 49″		1285·4 length of chord.											
1400	16° 2′ 34″		1381·8 ditto.											
1500	17° 11′ 19″		1477·6 ditto.											
1600	18° 20′ 5″		1572·9 ditto.											
1700	19° 28′ 50″		1667·4 ditto.											
1800	20° 37′ 35″		1761·4 ditto.											
1900	21° 46′ 20″		1854·6 ditto.											
2000	22° 55′ 6″		1947·1 ditto.											
50	0° 34′ 22·6″		50·00 ditto.											
10	0° 6′ 52·5″		10·00 ditto.											
1	0° 0′ 41·25″		1·00 ditto.											
To intermediate points.			25	50	75									
		O	0·37	0·50	0·37									
Method No. 4....			1st.	2nd.										
		D	99·97	99·91										
		O	2·00	4·00										

TABLE XXXI. RADIUS 2600. (CHORDS.)

LENGTH OF ARC.	TANGENTIAL ANGLE.		LENGTHS ROUND ARCS, WITH RIGHT-ANGLED OFFSETS (O) THERETO FROM DISTANCES (D) ON CHORDS.									
			100	200	300	400	500	600	700	800	900	1000
100	1° 6′ 7″	D	99·99									
		O	0·0									
200	2° 12′ 13″	D	99·97	199·9								
		O	1·92	0·0								
300	3° 18′ 20″	D	99·92	199·9	299·8							
		O	3·84	3·84	0·0							
400	4° 24′ 26″	D	99·83	199·8	299·8	399·6						
		O	5·76	7·68	5·76	0·0						
500	5° 30′ 33″	D	99·70	199·6	299·6	399·5	499·2					
		O	7·68	11·52	11·52	7·68	0·0					
600	6° 36′ 40″	D	99·53	199·4	299·3	399·3	499·1	598·7				
		O	9·59	15·35	17·27	15·35	9·59	0·0				
700	7° 42′ 46″											
800	8° 48′ 53″	D	99·09	198·6	298·5	398·4	498·4	598·2	697·8	796·8		
		O	13·42	23·01	28·77	30·69	28·77	23·01	13·42	0·0		
900	9° 55′ 0″											
1000	11° 1′ 6″	D	98·50	197·6	297·1	397	496·9	596·9	696·7	796·3	895·3	993·8
		O	17·22	30·64	40·24	46·00	47·92	46·00	40·24	30·64	17·22	0·0
50	0° 33′ 3·3″		50·00	length of chord.								
10	0° 6′ 36·7″		10·00	ditto.								
1	0° 0′ 39·67″		1·00	ditto.								
To intermediate points.		O	25 0·36	50 0·48	75 0·36							
Method No. 4...		D	1st. 99·97	2nd. 99·92								
		O	1·92	3·84								

TABLE XXXII. RADIUS **2800**. (CHORDS.)

LENGTH OF ARC.	TANGENTIAL ANGLE.		LENGTHS ROUND ARCS, WITH RIGHT-ANGLED OFFSETS (O) THERETO FROM DISTANCES (D) ON CHORDS.									
			100	200	300	400	500	600	700	800	900	1000
100	1° 1′ 23″	D	99·99									
		O	0·0									
200	2° 2′ 47″	D	99·98	199·9								
		O	1·78	0·0								
300	3° 4′ 10″	D	99·93	199·9	299·8							
		O	3·57	3·57	0·0							
400	4° 5′ 33″	D	99·85	199·8	299·8	399·6						
		O	5·36	7·14	5·36	0·0						
500	5° 6′ 57″	D	99·74	199·7	299·7	399·6	499·3					
		O	7·14	10·71	10·71	7·14	0·0					
600	6° 8′ 20″	D	99·59	199·4	299·4	399·4	499·3	598·8				
		O	8·92	14·28	16·06	14·28	8·92	0·0				
700	7° 9′ 43″											
800	8° 11′ 6″	D	99·21	198·8	298·7	398·6	498·6	598·5	698	797·3		
		O	12·47	21·39	26·75	28·53	26·75	21·39	12·47	0·0		
900	9° 12′ 30″											
1000	10° 13′ 53″	D	98·71	197·9	297·5	397·4	497·3	597·3	697·2	796·8	896	994·7
		O	16·00	28·47	37·39	42·75	44·53	42·75	37·39	28·47	16·00	0·0
50	0° 30′ 41·7″		50·00	length of chord.								
10	0° 6′ 8·3″		10·00		ditto.							
1	0° 0′ 36·83″		1·00		ditto.							
To intermediate points.		O	25 0·33	50 0·45	75 0·33							
Method No. 4...			1st.	2nd.								
		D	99·98	99·93								
		O	1·78	3·57								

TABLE XXXIII. RADIUS 3000. (CHORDS.)

LENGTH OF ARC.	TANGENTIAL ANGLE.		LENGTHS ROUND ARCS, WITH RIGHT-ANGLED OFFSETS (O) THERETO FROM DISTANCES (D) ON CHORDS.											
			100	200	300	400	500	600	700	800	900	1000	1100	1200
100	0° 57′ 18″	D	99·99											
		O	0·0											
200	1° 54′ 36″	D	99·98	199·9										
		O	1·66	0·0										
300	2° 51′ 53″	D	99·94	199·9	299·9									
		O	3·33	3·33	0·0									
400	3° 49′ 11″	D	99·87	199·8	299·8	399·7								
		O	5·00	6·66	5·00	0·0								
500	4° 46′ 29″	D	99·77	199·7	299·7	399·6	499·4							
		O	6·66	10·00	10·00	6·66	0·0							
600	5° 43′ 46″	D	99·65	199·5	299·5	399·5	499·3	599						
		O	8·32	13·32	14·98	13·32	8·32	0·0						
700	6° 41′ 4″	D	99·49	199·3	299·2	399·2	499·1	598·9	698·4					
		O	9·98	16·64	19·97	19·97	16·64	9·98	0·0					
800	7° 38′ 22″	D	99·31	199	298·8	398·8	498·8	598·7	698·3	797·5				
		O	11·64	19·96	24·96	26·62	24·96	19·96	11·64	0·0				
900	8° 35′ 40″	D	99·12	198·6	298·4	398·3	498·3	598·2	698	797·5	896·6			
		O	13·29	23·27	29·93	33·26	33·26	29·93	23·27	13·29	0·0			
1000	9° 32′ 57″	D	98·87	198·2	297·8	397·7	497·7	597·7	697·5	797·2	896·5	995·5		
		O	14·94	26·58	34·90	39·90	41·56	39·90	34·90	26·58	14·94	0·0		
1100	10° 30′ 15″	D	98·61	197·7	297·2	397	496·9	596·9	696·9	796·6	896·1	995·2	1093·8	
		O	16·59	29·88	39·86	46·52	49·85	49·85	46·52	39·86	29·88	16·59	0·0	
1200	11° 27′ 33″	D	98·32	197·2	296·5	396·2	496	596	696	795·9	895·5	994·8	1093·7	1192
		O	18·23	33·17	44·81	53·13	58·13	59·80	58·13	53·13	44·81	33·17	18·23	0·0
1300	12° 24′ 51″		1289·8 length of chord.											
1400	13° 22′ 8″		1387·3 ditto.											
1500	14° 19′ 26″		1484·4 ditto.											
1600	15° 16′ 44″		1581·1 ditto.											
1700	16° 14′ 2″		1677·3 ditto.											
1800	17° 11′ 19″		1773·1 ditto.											
1900	18° 8′ 37″		1868·4 ditto.											
2000	19° 5′ 55″		1963·2 ditto.											
2500	23° 52′ 24″		2428.3 ditto.											
3000	28° 38′ 52″		2876·6 ditto.											
50	0° 28′ 38·9″		50·00 ditto.											
10	0° 5′ 43·8″		10·00 ditto.											
1	0° 0′ 34·38″		1·00 ditto.											
To intermediate points.		O	25 0·31	50 0·42	75 0·31									
Method No. 4....			1st.	2nd.										
		D	99·98	99·94										
		O	1·67	3·33										

ABLE XXXIV. RADIUS 3500. (CHORDS.)

TANGENTIAL ANGLE.		LENGTHS ROUND ARCS, WITH RIGHT-ANGLED OFFSETS (O) THERETO FROM DISTANCES (D) ON CHORDS.											
		100	200	300	400	500	600	700	800	900	1000	1100	1200
0° 49′ 7″	D	100											
	O	0·0											
1° 38′ 13″	D	99·98	200										
	O	1·43	0·0										
2° 27′ 20″	D	99·95	199·9	299·9									
	O	2·86	2·86	0·0									
3° 16′ 26″	D	99·90	199·9	299·9	399·8								
	O	4·28	5·71	4·28	0·0								
4° 5′ 33″	D	99·83	199·8	299·8	399·7	499·6							
	O	5·71	8·57	8·57	5·71	0·0							
4° 54′ 40″	D	99·74	199·6	299·6	399·6	499·5	599·3						
	O	7·14	11·42	12·85	11·42	7·14	0·0						
5° 43′ 46″	D	99·63	199·5	299·4	399·4	499·4	599·2	698·8					
	O	8·56	14·27	17·13	17·13	14·27	8·56	0·0					
6° 32′ 53″	D	99·50	199·2	299·1	399·1	499·1	599	698·7	798·3				
	O	9·98	17·12	21·40	22·83	21·40	17·12	9·98	0·0				
7° 22′ 0″	D	99·34	199	298·8	398·7	498·7	598·7	698·5	798·2	897·5			
	O	11·40	19·96	25·67	28·53	28·53	25·67	19·96	11·40	0·0			
8° 11′ 6″	D	99·17	198·7	298·4	398·3	498·3	598·3	698·2	797·9	897·4	996·6		
	O	12·82	22·80	29·94	34·22	35·65	34·22	29·94	22·80	12·82	0·0		
9° 0′ 13″	D	98·97	198·3	297·9	397·8	497·7	597·7	697·7	797·5	897·1	996·5	1095·5	
	O	14·24	25·64	34·20	39·91	42·77	42·77	39·91	34·20	25·64	14·24	0·0	
9° 49′ 20″	D	98·76	197·9	297·4	397·2	497·1	597·1	697	796·9	896·7	996·2	1095·3	1194·2
	O	15·65	28·47	38·45	45·59	49·87	51·30	49·87	45·59	38·45	28·47	15·65	0·0
10° 38′ 26″		1292·5 length of chord.											
11° 27′ 33″		1390·7 ditto.											
12° 16′ 39″		1488·6 ditto.											
13° 5′ 46″		1586·1 ditto.											
13° 54′ 53″		1683·3 ditto.											
14° 43′ 59″		1780·2 ditto.											
15° 33′ 6″		1876·8 ditto.											
16° 22′ 13″		1972·9 ditto.											
20° 27′ 46″		2447·2 ditto.											
24° 33′ 19″		2909·0 ditto.											
32° 44′ 25″		3785·8 ditto.											
0° 24′ 33·3″		50·00 ditto.											
0° 4′ 54·7″		10·00 ditto.											
0° 0′ 29·47″		1·00 ditto.											
Intermediate Pts.	O	25 0·27	50 0·36	75 0·27									
Rod No. 4....		1st.	2nd.										
	D	99·98	99·95										
	O	1·43	2·86										

TABLE XXXV. RADIUS 4000. (CHORDS.)

LENGTH OF ARC.	TANGENTIAL ANGLE.		LENGTHS ROUND ARCS, WITH RIGHT-ANGLED OFFSETS (O) THERETO FROM DISTANCES (D) ON CHORDS.											
			100	200	300	400	500	600	700	800	900	1000	1100	120
100	0° 42′ 58″	D	100											
		O	0·0											
200	1° 25′ 57″	D	99·99	200										
		O	1·25	0·0										
300	2° 8′ 55″	D	99·97	200	299·9									
		O	2·50	2·50	0·0									
400	2° 51′ 53″	D	99·93	199·9	299·9	399·8								
		O	3·75	5·00	3·75	0·0								
500	3° 34′ 52″	D	99·87	199·8	299·8	399·8	499·7							
		O	5·00	7·50	7·50	5·00	0·0							
600	4° 17′ 50″	D	99·80	199·7	299·7	399·7	499·6	599·4						
		O	6·24	9·99	11·24	9·99	6·24	0·0						
700	5° 0′ 48″	D	99·72	199·6	299·6	399·6	499·6	599·4	699·1					
		O	7·49	12·49	14·99	14·99	12·49	7·49	0·0					
800	5° 43′ 46″	D	99·61	199·4	299·3	399·3	499·3	599·3	699·1	798·7				
		O	8·74	14·98	18·73	19·98	18·73	14·98	8·74	0·0				
900	6° 26′ 45″	D	99·50	199·2	299·1	399·1	499·1	599·1	699	798·7	898·1			
		O	9·98	17·47	22·47	24·97	24·97	22·47	17·47	9·98	0·0			
1000	7° 9′ 43″	D	99·36	199	298·8	398·7	498·7	598·7	698·6	798·4	898	997·4		
		O	11·23	19·97	26·21	29·96	31·21	29·96	26·21	19·97	11·23	0·0		
1100	7° 52′ 41″	D	99·22	198·7	298·4	398·3	498·3	598·3	698·3	798·2	897·9	997·4	1096·5	
		O	12·47	22·45	29·94	34·94	37·44	37·44	34·94	29·94	22·45	12·47	0·0	
1200	8° 35′ 40″	D	99·05	198·4	298	397·8	497·8	597·8	697·8	797·7	897·5	997·1	1096·5	119
		O	13·71	24·94	33·68	39·92	43·67	44·92	43·67	39·92	33·68	24·94	13·71	0·0
1300	9° 18′ 38″		1294·3 length of chord.											
1400	10° 1′ 36″		1392·9 ditto.											
1500	10° 44′ 35″		1491·2 ditto.											
1600	11° 27′ 33″		1589·4 ditto.											
1700	12° 10′ 31″		1687·2 ditto.											
1800	12° 53′ 29″		1784·9 ditto.											
1900	13° 36′ 28″		1882·2 ditto.											
2000	14° 19′ 26″		1979·2 ditto.											
2500	17° 54′ 18″		2459·5 ditto.											
3000	21° 29′ 9″		2930·2 ditto.											
4000	28° 38′ 52″		3835·4 ditto.											
50	0° 21′ 29·2″		50·00 ditto.											
10	0° 4′ 17·8″		10·00 ditto.											
1	0° 0′ 25·78″		1·00 ditto.											
To intermediate points.			25	50	75									
		O	0·23	0·31	0·23									
Method No. 4....			1st.	2nd.										
		D	99·99	99·97										
		O	1·25	2·50										

TABLE XXXVI. RADIUS 4500. (CHORDS.)

LENGTH OF ARC.	TANGENTIAL ANGLE.		LENGTHS ROUND ARCS, WITH RIGHT-ANGLED OFFSETS (O) THERETO FROM DISTANCES (D) ON CHORDS.											
			100	200	300	400	500	600	700	800	900	1000	1100	1200
100	0° 38′ 12″	D	100											
		O	0·0											
200	1° 16′ 24″	D	99·99	200										
		O	1·11	0·0										
300	1° 54′ 35″	D	99·97	200	299·9									
		O	2·22	2·22	0·0									
400	2° 32′ 47″	D	99·94	199·9	299·9	399·9								
		O	3·33	4·44	3·33	0·0								
500	3° 10′ 59″	D	99·90	199·9	299·9	399·8	499·7							
		O	4·44	6·66	6·66	4·44	0·0							
600	3° 49′ 11″	D	99·84	199·8	299·8	399·8	499·7	599·5						
		O	5·55	8·88	9·99	8·88	5·55	0·0						
700	4° 27′ 23″	D	99·77	199·7	299·6	399·6	499·6	599·5	699·3					
		O	6·66	11·10	13·32	13·32	11·10	6·66	0·0					
800	5° 5′ 35″	D	99·69	199·5	299·5	399·5	499·5	599·4	699·2	799				
		O	7·77	13·32	16·65	17·76	16·65	13·32	7·77	0·0				
900	5° 43′ 46″	D	99·60	199·4	299·3	399·2	499·2	599·2	699·1	798·9	898·5			
		O	8·88	15·54	19·98	22·20	22·20	19·98	15·54	8·88	0·0			
1000	6° 21′ 58″	D	99·50	199·2	299	399	499	599	698·9	798·7	898·4	997·9		
		O	9·98	17·75	23·30	26·63	27·74	26·63	23·30	17·75	9·98	0·0		
1100	7° 0′ 10″	D	99·38	199	298·8	398·7	498·6	598·6	698·6	798·5	898·3	997·9	1097·3	
		O	11·09	19·97	26·63	31·07	33·29	33·29	31·07	26·63	19·97	11·09	0·0	
1200	7° 38′ 22″	D	99·25	198·8	298·4	398·3	498·2	598·2	698·2	798·1	898	997·7	1097·2	1196·4
		O	12·19	22·17	29·94	35·49	38·82	39·93	38·82	35·49	29·94	22·17	12·19	0·0
1300	8° 16′ 34″		1295·5 length of chord.											
1400	8° 54′ 46″		1394·4 ditto.											
1500	9° 32′ 57″		1493·0 ditto.											
1600	10° 11′ 9″		1591·6 ditto.											
1700	10° 49′ 21″		1689·9 ditto.											
1800	11° 27′ 33″		1788·0 ditto.											
1900	12° 5′ 45″		1885·9 ditto.											
2000	12° 43′ 57″		1983·6 ditto.											
2500	15° 54′ 56″		2468·0 ditto.											
3000	19° 5′ 55″		2944·8 ditto.											
4000	25° 27′ 53″		3869·6 ditto.											
5000	31° 49′ 51″		4746·7 ditto.											
50	0° 19′ 5·9″		50·00 ditto.											
10	0° 3′ 49·2″		10·00 ditto.											
1	0° 0′ 22·92″		1·00 ditto.											
To intermediate points.		O	25	50	75									
			0·21	0·28	0·21									
Method No. 4....			1st.	2nd.										
		D	99·99	99·97										
		O	1·11	2·22										

TABLE XXXVII. RADIUS 5000. (CHORDS.)

LENGTH OF ARC.	TANGENTIAL ANGLE.		LENGTHS ROUND ARCS, WITH RIGHT-ANGLED OFFSETS (O) THERETO FROM DISTANCES (D) ON CHORDS.											
			100	200	300	400	500	600	700	800	900	1000	1100	1200
100	0° 34′ 23″	D	100											
		O	0·0											
200	1° 8′ 45″	D	99·99	200										
		O	1·00	0·0										
300	1° 43′ 8″	D	99·98	200	300									
		O	2·00	2·00	0·0									
400	2° 17′ 31″	D	99·95	199·9	299·9	399·9								
		O	3·00	4·00	3·00	0·0								
500	2° 51′ 53″	D	99·92	199·9	299·9	399·9	499·8							
		O	4·00	6·00	6·00	4·00	0·0							
600	3° 26′ 16″	D	99·87	199·8	299·8	399·8	499·7	599·6						
		O	5·00	8·00	9·00	8·00	5·00	0·0						
700	4° 0′ 39″	D	99·82	199·7	299·7	399·7	499·7	599·6	699·4					
		O	6·00	10·00	12·00	12·00	10·00	6·00	0·0					
800	4° 35′ 1″	D	99·75	199·6	299·6	399·6	499·6	599·5	699·4	799·1				
		O	6·99	11·99	14·99	15·99	14·99	11·99	6·99	0·0				
900	5° 9′ 24″	D	99·68	199·6	299·5	399·3	499·3	599·3	699·2	799·1	898·8			
		O	7·99	13·99	17·99	19·99	19·99	17·99	13·99	7·99	0·0			
1000	5° 43′ 46″	D	99·59	199·3	299·2	399·2	499·1	599·1	699·1	799	898·7	998·3		
		O	8·99	15·98	20·98	23·98	24·98	23·98	20·98	15·98	8·99	0·0		
1100	6° 18′ 9″	D	99·50	199·2	299	398·9	498·9	598·9	698·9	798·8	898·6	998·3	1097·8	
		O	9·98	17·97	23·97	27·97	29·97	29·97	27·97	23·97	17·97	9·98	0·0	
1200	6° 52′ 32″	D	99·39	199	298·7	398·6	498·5	598·5	698·5	798·5	898·4	998·1	1097·7	1197·1
		O	10·98	19·97	26·96	31·96	34·96	35·96	34·96	31·96	26·96	19·97	10·98	0·0
1300	7° 26′ 54″		1296·3 length of chord.											
1400	8° 1′ 17″		1395·4 ditto.											
1500	8° 35′ 40″		1494·4 ditto.											
1600	9° 10′ 2″		1593·2 ditto.											
1700	9° 44′ 25″		1691·8 ditto.											
1800	10° 18′ 48″		1790·3 ditto.											
1900	10° 53′ 10″		1888·6 ditto.											
2000	11° 27′ 33″		1986·7 ditto.											
2500	14° 19′ 26″		2474·0 ditto.											
3000	17° 11′ 19″		2955·2 ditto.											
4000	22° 55′ 6″		3894·2 ditto.											
5000	28° 38′ 52″		4794·2 ditto.											
50	0° 17′ 11·3″		50·00 ditto.											
10	0° 3′ 26·3″		10·00 ditto.											
1	0° 0′ 20·63″		1·00 ditto.											
To intermediate points.		O	25 0·19	50 0·25	75 0·19									
Method No. 4...		D	1st. 99·99	2nd. 99·98										
		O	1·00	2·00										

TABLE XXXVIII. RADIUS 5500. (CHORDS.)

LENGTH OF ARC.	TANGENTIAL ANGLE.		LENGTHS ROUND ARCS, WITH RIGHT-ANGLED OFFSETS (O) THERETO FROM DISTANCES (D) ON CHORDS.											
			100	200	300	400	500	600	700	800	900	1000	1100	1200
100	0° 31′ 15″	D	100											
		O	0·0											
200	1° 2′ 30″	D	99·99	200										
		O	0·91	0·0										
300	1° 33′ 45″	D	99·98	200	300									
		O	1·82	1·82	0·0									
400	2° 5′ 0″	D	99·96	200	300	399·9								
		O	2·73	3·64	2·73	0·0								
500	2° 36′ 16″	D	99·93	199·9	299·9	399·9	499·8							
		O	3·64	5·46	5·46	3·64	0·0							
600	3° 7′ 31″	D	99·89	199·8	299·8	399·8	499·8	599·7						
		O	4·55	7·28	8·19	7·28	4·55	0·0						
700	3° 38′ 46″	D	99·85	199·8	299·8	399·8	499·7	599·6	699·5					
		O	5·45	9·09	10·91	10·91	9·09	5·45	0·0					
800	4° 10′ 1″	D	99·80	199·7	299·7	399·6	499·6	599·6	699·5	799·3				
		O	6·36	10·91	13·64	14·55	13·64	10·91	6·36	0·0				
900	4° 41′ 16″	D	99·73	199·6	299·5	399·5	499·5	599·5	699·4	799·3	899			
		O	7·27	12·72	16·36	18·18	18·18	16·36	12·72	7·27	0·0			
1000	5° 12′ 31″	D	99·66	199·5	299·4	399·3	499·3	599·3	699·3	799·1	898·9	998·6		
		O	8·17	14·53	19·08	21·81	22·72	21·81	19·08	14·53	8·17	0·0		
1100	5° 43′ 46″	D	99·58	199·3	299·2	399·1	499·1	599·1	699·1	799	898·8	998·6	1098·2	
		O	9·08	16·35	21·80	25·44	27·26	27·26	25·44	21·80	16·35	9·08	0·0	
1200	6° 15′ 2″	D	99·50	199·2	299	398·8	498·8	598·8	698·8	798·7	898·6	998·4	1098·1	1197·6
		O	9·98	18·15	24·51	29·06	31·79	32·70	31·79	29·06	24·51	18·15	9·98	0·0
1300	6° 46′ 17″		1297·0 length of chord.											
1400	7° 17′ 32″		1396·2 ditto.											
1500	7° 48′ 47″		1495·3 ditto.											
1600	8° 20′ 2″		1594·4 ditto.											
1700	8° 51′ 17″		1693·2 ditto.											
1800	9° 22′ 32″		1792·0 ditto.											
1900	9° 53′ 47″		1890·6 ditto.											
2000	10° 25′ 3″		1989·0 ditto.											
2500	13° 1′ 18″		2478·5 ditto.											
3000	15° 37′ 34″		2963·0 ditto.											
4000	20° 50′ 5″		3912·4 ditto.											
5000	26° 2′ 36″		4829·6 ditto.											
50	0° 15′ 37·6″		50·00 ditto.											
10	0° 3′ 7·5″		10·00 ditto.											
1	0° 0′ 18·75″		1·00 ditto.											
To intermediate points.			25	50	75									
		O	0·17	0·23	0·17									
Method No. 4....			1st.	2nd.										
		D	99·99	99·98										
		O	0·91	1·82										

TABLE XXXIX. RADIUS 6000. (CHORDS.)

LENGTH OF ARC.	TANGENTIAL ANGLE.		LENGTHS ROUND ARCS, WITH RIGHT-ANGLED OFFSETS (O) THERETO FROM DISTANCES (D) ON CHORDS.											
			100	200	300	400	500	600	700	800	900	1000	1100	1200
100	0° 28′ 39″	D	100											
		O	0·0											
200	0° 57′ 18″	D	100	200										
		O	0·83	0·0										
300	1° 25′ 57″	D	99·99	200	300									
		O	1·66	1·66	0·0									
400	1° 54′ 36″	D	99·97	200	300	399·9								
		O	2·50	3·33	2·50	0·0								
500	2° 23′ 14″	D	99·94	199·9	299·9	399·9	499·8							
		O	3·33	5·00	5·00	3·33	0·0							
600	2° 51′ 53″	D	99·91	199·9	299·9	399·9	499·8	599·7						
		O	4·16	6·66	7·50	6·66	4·16	0·0						
700	3° 20′ 32″	D	99·87	199·8	299·8	399·8	499·8	599·7	699·6					
		O	5·00	8·33	10·00	10·00	8·33	5·00	0·0					
800	3° 49′ 11″	D	99·83	199·8	299·7	399·7	499·7	599·7	699·6	799·4				
		O	5·83	10·00	12·50	13·33	12·50	10·00	5·83	0·0				
900	4° 17′ 50″	D	99· 8	199·7	299·6	399·6	499·6	599·6	699·5	799·4	899·1			
		O	6·65	11·65	14·98	16·64	16·64	14·98	11·65	6·65	0·0			
1000	4° 46′ 29″	D	99·72	199·6	299·5	399·4	499·4	599·4	699·4	799·3	899·1	998·9		
		O	7·49	13·32	17·48	19·98	20·81	19·98	17·48	13·32	7·49	0·0		
1100	5° 15′ 8″	D	99·65	199·4	299·3	399·3	499·2	599·2	699·2	799·1	899	998·8	1098·5	
		O	8·32	14·97	19·97	23·30	24·96	24·96	23·30	19·97	14·97	8·32	0·0	
1200	5° 43′ 46″	D	99·58	199·3	299·1	399	499	599	699	799	898·9	898·7	1098·4	1198
		O	9·15	16·64	22·47	26·63	29·13	29·96	29·13	26·63	22·47	16·64	9·15	0·0
1300	6° 12′ 25″		1297·5 length of chord.											
1400	6° 41′ 4″		1396·8		ditto.									
1500	7° 9′ 43″		1496·1		ditto.									
1600	7° 38′ 22″		1595·2		ditto.									
1700	8° 7′ 1″		1694·4		ditto.									
1800	8° 35′ 40″		1793·2		ditto.									
1900	9° 4′ 19″		1892·0		ditto.									
2000	9° 32′ 57″		1990·8		ditto.									
2500	11° 56′ 12″		2482·0		ditto.									
3000	14° 19′ 26″		2968·8		ditto.									
4000	19° 5′ 55″		3926·4		ditto.									
5000	23° 52′ 24″		4856·6		ditto.									
6000	28° 38′ 52″		5753·2		ditto.									
50	0° 14′ 19·4″		50·00		ditto.									
10	0° 2′ 51·9″		10·00		ditto.									
1	0° 0′ 17·19″		1·00		ditto.									
To intermediate points.			25	50	75									
		O	0·16	0·21	0·16									
Method No. 4....			1st.	2nd.										
		D	100	99·99										
		O	0·83	1·66										

TABLE XL. RADIUS 6500. (CHORDS.)

LENGTH OF ARC.	TANGENTIAL ANGLE.		LENGTHS ROUND ARCS, WITH RIGHT-ANGLED OFFSETS (O) THERETO FROM DISTANCES (D) ON CHORDS.											
			100	200	300	400	500	600	700	800	900	1000	1100	1200
100	0° 26′ 27″	D	100											
		O	0·0											
200	0° 52′ 53″	D	100	200										
		O	0·77	0·0										
300	1° 19′ 20″	D	99·99	200	300									
		O	1·54	1·54	0·0									
400	1° 45′ 47″	D	99·98	200	300	400								
		O	2·31	3·08	2·31	0·0								
500	2° 12′ 13″	D	99·95	199·9	299·9	399·9	499·9							
		O	3·08	4·62	4·62	3·08	0·0							
600	2° 38′ 40″	D	99·93	199·9	299·9	399·9	499·9	599·8						
		O	3·85	6·16	6·93	6·16	3·85	0·0						
700	3° 5′ 7″	D	99·89	199·8	299·8	399·8	499·8	599·8	699·7					
		O	4·61	7·69	9·23	9·23	7·69	4·61	0·0					
800	3° 31′ 33″	D	99·86	199·8	299·8	399·8	499·8	599·8	699·7	799·5				
		O	5·38	9·23	11·54	12·31	11·54	9·23	5·38	0·0				
900	3° 58′ 0″	D	99·81	199·7	299·6	399·6	499·6	599·6	699·6	799·5	899·3			
		O	6·15	10·76	13·84	15·38	15·38	13·84	10·76	6·15	0·0			
1000	4° 24′ 27″	D	99·76	199·6	299·5	399·5	499·5	599·5	699·5	799·4	899·3	999·1		
		O	6·92	12·30	16·15	18·46	19·23	18·46	16·15	12·30	6·92	0·0		
1100	4° 50′ 53″	D	99·70	199·5	299·4	399·3	499·3	599·3	699·3	799·3	899·2	999	1098·7	
		O	7·69	13·84	18·45	21·53	23·07	23·07	21·53	18·45	13·84	7·69	0·0	
1200	5° 17′ 20″	D	99·64	199·4	299·3	399·2	499·2	599·2	699·2	799·2	899·1	998·9	1098·7	1198·3
		O	8·45	15·37	20·75	24·60	26·91	27·68	26·91	24·60	20·75	15·37	8·45	0·0
1300	5° 43′ 46″		1297·8 length of chord.											
1400	6° 10′ 13″		1397·3 ditto.											
1500	6° 36′ 40″		1496·7 ditto.											
1600	7° 3′ 6″		1595·9 ditto.											
1700	7° 29′ 33″		1695·1 ditto.											
1800	7° 56′ 0″		1794·2 ditto.											
1900	8° 22′ 26″		1893·2 ditto.											
2000	8° 48′ 53″		1992·1 ditto.											
2500	11° 1′ 6″		2484·6 ditto.											
3000	13° 13′ 19″		2973·4 ditto.											
4000	17° 37′ 46″		3937·0 ditto.											
5000	22° 2′ 12″		4877·6 ditto.											
50	0° 13′ 13·3″		50·00 ditto.											
10	0° 2′ 38·7″		10·00 ditto.											
1	0° 0′ 15·87″		1·00 ditto.											
To intermediate points.			25	50	75									
		O	0·15	0·19	0·15									
Method No. 4....			1st.	2nd.										
		D	100	99·99										
		O	0·77	1·54										

TABLE XLI. RADIUS 7000. (CHORDS.)

LENGTH OF ARC.	TANGENTIAL ANGLE.		LENGTHS ROUND ARCS, WITH RIGHT-ANGLED OFFSETS (O) THERETO FROM DISTANCES (D) ON CHORDS.											
			100	200	300	400	500	600	700	800	900	1000	1100	1200
100	0° 24′ 33″	D	100											
		O	0·0											
200	0° 49′ 7″	D	100	200										
		O	0·71	0·0										
300	1° 13′ 40″	D	99·99	200	300									
		O	1·43	1·43	0·0									
400	1° 38′ 13″	D	99·98	200	300	400								
		O	2·14	2·85	2·14	0·0								
500	2° 2′ 47″	D	99·96	199·9	299·9	399·9	499·9							
		O	2·85	4·28	4·28	2·85	0·0							
600	2° 27′ 20″	D	99·94	199·9	299·9	399·9	499·9	599·8						
		O	3·57	5·71	6·42	5·71	3·57	0·0						
700	2° 51′ 53″	D	99·91	199·9	299·9	399·9	499·9	599·8	699·7					
		O	4·28	7·13	8·56	8·56	7·13	4·28	0·0					
800	3° 16′ 26″	D	99·88	199·8	299·8	399·8	499·8	599·8	699·7	799·6				
		O	5·00	8·57	10·71	11·42	10·71	8·57	5·00	0·0				
900	3° 41′ 0″	D	99·84	199·8	299·7	399·7	499·7	599·7	699·6	799·5	899·4			
		O	5·71	9·99	12·84	14·27	14·27	12·84	9·99	5·71	0·0			
1000	4° 5′ 33″	D	99·79	199·7	299·6	399·6	499·6	599·6	699·6	799·5	899·4	999·2		
		O	6·42	11·42	15·00	17·14	17·85	17·14	15·00	11·42	6·42	0·0		
1100	4° 30′ 6″	D	99·74	199·6	299·5	399·4	499·4	599·4	699·4	799·4	899·3	999·1	1098·9	
		O	7·14	12·85	17·13	19·98	21·41	21·41	19·98	17·13	12·85	7·14	0·0	
1200	4° 54′ 40″	D	99·69	199·5	299·4	399·3	499·3	599·3	699·3	799·2	899·2	999	1098·8	1198·5
		O	7·85	14·27	19·27	22·84	24·98	25·69	24·98	22·84	19·27	14·27	7·85	0·0
1300	5° 19′ 13″		1298·1 length of chord.											
1400	5° 43′ 46″		1397·7 ditto.											
1500	6° 8′ 20″		1497·2 ditto.											
1600	6° 32′ 53″		1596·5 ditto.											
1700	6° 57′ 26″		1695·8 ditto.											
1800	7° 22′ 0″		1795·0 ditto.											
1900	7° 46′ 33″		1894·2 ditto.											
2000	8° 11′ 6″		1993·2 ditto.											
2500	10° 13′ 53″		2486·7 ditto.											
3000	12° 16′ 39″		2977·2 ditto.											
4000	16° 22′ 13″		3945·8 ditto.											
5000	20° 27′ 46″		4894·4 ditto.											
6000	24° 33′ 19″		5818·0 ditto.											
50	0° 12′ 16·6″		50·00 ditto.											
10	0° 2′ 27·3″		10·00 ditto.											
1	0° 0′ 14·73″		1·00 ditto.											
To intermediate points.		O	25 0·14	50 0·18	75 0·14									
Method No. 4....			1st.	2nd.										
		D	100	99·99										
		O	0·71	1·43										

TABLE XLII. RADIUS 7500. (CHORDS.)

LENGTH OF ARC.	TANGENTIAL ANGLE.		LENGTHS ROUND ARCS, WITH RIGHT-ANGLED OFFSETS (O) THERETO FROM DISTANCES (D) ON CHORDS.											
			100	200	300	400	500	600	700	800	900	1000	1100	1200
100	0° 22′ 55″	D	100											
		O	0·0											
200	0° 45′ 50″	D	100	200										
		O	0·67	0·0										
300	1° 8′ 45″	D	99·99	200	300									
		O	1·33	1·33	0·0									
400	1° 31′ 40″	D	99·98	200	300	400								
		O	2·00	2·66	2·00	0·0								
500	1° 54′ 36″	D	99·96	200	300	399·9	499·9							
		O	2·67	4·00	4·00	2·67	0·0							
600	2° 17′ 31″	D	99·94	199·9	299·9	399·9	499·9	599·8						
		O	3·33	5·33	6·00	5·33	3·33	0·0						
700	2° 40′ 26″	D	99·92	199·9	299·9	399·9	499·9	599·8	699·7					
		O	4·00	6·67	8·00	8·00	6·67	4·00	0·0					
800	3° 3′ 21″	D	99·89	199·8	299·8	399·8	499·8	599·8	699·7	799·6				
		O	4·66	8·00	10·00	10·66	10·00	8·00	4·66	0·0				
900	3° 26′ 16″	D	99·86	199·8	299·7	399·7	499·7	599·7	699·7	799·6	899·5			
		O	5·33	9·33	12·00	13·33	13·33	12·00	9·33	5·33	0·0			
1000	3° 49′ 11″	D	99·82	199·7	299·6	399·6	499·6	599·6	699·6	799·5	899·4	999·3		
		O	6·00	10·66	14·00	16·00	16·66	16·00	14·00	10·66	6·00	0·0		
1100	4° 12′ 6″	D	99·78	199·6	299·6	399·5	499·5	599·5	699·5	799·5	899·4	999·2	1099	
		O	6·66	12·00	16·00	18·67	20·00	20·00	18·67	16·00	12·00	6·66	0·0	
1200	4° 35′ 1″	D	99·73	199·6	299·4	399·4	499·4	599·4	699·4	799·3	899·3	999·2	1099	1198·7
		O	7·33	13·33	18·00	21·33	23·33	24·00	23·33	21·33	18·00	13·33	7·33	0·0
1300	4° 57′ 56″		1298·4 length of chord.											
1400	5° 20′ 51″		1398·0 ditto.											
1500	5° 43′ 47″		1497·5 ditto.											
1600	6° 6′ 42″		1597·0 ditto.											
1700	6° 29′ 37″		1696·3 ditto.											
1800	6° 52′ 32″		1795·6 ditto.											
1900	7° 15′ 27″		1894·9 ditto.											
2000	7° 38′ 22″		1994·0 ditto.											
2500	9° 32′ 58″		2488·4 ditto.											
3000	11° 27′ 33″		2980·0 ditto.											
4000	15° 16′ 44″		3952·8 ditto.											
5000	19° 5′ 55″		4908·0 ditto.											
50	0° 11′ 27·6″		50·00 ditto.											
10	0° 2′ 17·5″		10·00 ditto.											
1	0° 0′ 13·75″		1·00 ditto.											
To intermediate points.		O	25 0·13	50 0·17	75 0·13									
Method No. 4...		D	1st. 100	2nd. 99·99										
		O	0·66	1·33										

TABLE XLIII. RADIUS 8000. (CHORDS.)

LENGTH OF ARC.	TANGENTIAL ANGLE.		LENGTHS ROUND ARCS, WITH RIGHT-ANGLED OFFSETS (O) THERETO FROM DISTANCES (D) ON CHORDS.											
			100	200	300	400	500	600	700	800	900	1000	1100	1200
100	0° 21′ 29″	D	100											
		O	0·0											
200	0° 42′ 58″	D	100	200										
		O	0·62	0·0										
300	1° 4′ 27″	D	100	200	300									
		O	1·25	1·25	0·0									
400	1° 25′ 57″	D	100	200	300	400								
		O	1·87	2·50	1·87	0·0								
500	1° 47′ 26″	D	100	200	300	399·9	499·9							
		O	2·50	3·75	3·75	2·50	0·0							
600	2° 8′ 55″	D	100	199·9	299·9	399·9	499·9	599·8						
		O	3·12	5·00	5·62	5·00	3·12	0·0						
700	2° 30′ 24″	D	99·9	199·9	299·9	399·9	499·9	599·8	699·8					
		O	3·75	6·25	7·50	7·50	6·25	3·75	0·0					
800	2° 51′ 53″	D	99·9	199·8	299·8	399·8	499·8	599·8	699·8	799·7				
		O	4·37	7·50	9·37	10·00	9·37	7·50	4·37	0·0				
900	3° 13′ 22″	D	99·9	199·8	299·8	399·8	499·8	599·8	699·7	799·7	899·5			
		O	5·00	8·75	11·25	12·50	12·50	11·25	8·75	5·00	0·0			
1000	3° 34′ 52″	D	99·8	199·7	299·7	399·7	499·7	599·7	699·6	799·6	899·5	999·3		
		O	5·62	10·00	13·12	15·00	15·62	15·00	13·12	10·00	5·62	0·0		
1100	3° 56′ 21″	D	99·8	199·7	299·6	399·6	499·6	599·6	699·6	799·5	899·5	999·3	1099·1	
		O	6·25	11·25	15·00	17·50	18·75	18·75	17·50	15·00	11·25	6·25	0·0	
1200	4° 17′ 50″	D	99·8	199·6	299·5	399·5	499·5	599·5	699·5	799·4	899·4	999·3	1099·1	1198·9
		O	6·87	12·50	16·87	20·00	21·87	22·50	21·87	20·00	16·87	12·50	6·87	0·0
1300	4° 39′ 19″		1298·6 length of chord.											
1400	5° 0′ 48″		1398·2 ditto.											
1500	5° 22′ 17″		1497·8 ditto.											
1600	5° 43′ 46″		1597·4 ditto.											
1700	6° 5′ 16″		1696·8 ditto.											
1800	6° 26′ 45″		1796·2 ditto.											
1900	6° 48′ 14″		1895·6 ditto.											
2000	7° 9′ 43″		1994·8 ditto.											
2500	8° 57′ 9″		2489·9 ditto.											
3000	10° 44′ 35″		2982·6 ditto.											
4000	14° 19′ 26″		3958·8 ditto.											
5000	17° 54′ 18″		4919·0 ditto.											
6000	21° 29′ 9″		5860·4 ditto.											
50	0° 10′ 44·6″		50·00 ditto.											
10	0° 2′ 8·9″		10·00 ditto.											
1	0° 0′ 12·89″		1·00 ditto.											
To intermediate points.		O	25 0·12	50 0·16	75 0·12									
Method No. 4....			1st.	2nd.										
		D	100	100										
		O	0·02	1·25										

TABLE XLIV. RADIUS 9000. (CHORDS.)

LENGTH OF ARC.	TANGENTIAL ANGLE.		LENGTHS ROUND ARCS, WITH RIGHT-ANGLED OFFSETS (O) THERETO FROM DISTANCES (D) ON CHORDS.											
			100	200	300	400	500	600	700	800	900	1000	1100	1200
100	0° 19′ 6″	D	100											
		O	0·0											
200	0° 38′ 12″	D	100	200										
		O	0·55	0·0										
300	0° 57′ 18″	D	100	200	300									
		O	1·11	1·11	0·0									
400	1° 16′ 24″	D	100	200	300	400								
		O	1·66	2·22	1·66	0·0								
500	1° 35′ 30″	D	100	200	300	400	499·9							
		O	2·22	3·33	3·33	2·22	0·0							
600	1° 54′ 35″	D	100	200	300	399·9	499·9	599·9						
		O	2·77	4·44	5·00	4·44	2·77	0·0						
700	2° 13′ 41″	D	99·9	199·9	299·9	399·9	499·9	599·9	699·8					
		O	3·33	5·55	6·66	6·66	5·55	3·33	0·0					
800	2° 32′ 47″	D	99·9	199·9	299·9	399·9	499·9	599·8	699·8	799·8				
		O	3·88	6·66	8·33	8·88	8·33	6·66	3·88	0·0				
900	2° 51′ 53″	D	99·9	199·8	299·8	399·8	499·8	599·8	699·8	799·7	899·6			
		O	4·44	7·77	10·00	11·11	11·11	10·00	7·77	4·44	0·0			
1000	3° 10′ 59″	D	99·9	199·8	299·8	399·8	499·8	599·7	699·7	799·7	899·6	999·5		
		O	5·00	8·88	11·66	13·33	13·88	13·33	11·66	8·88	5·00	0·0		
1100	3° 30′ 5″	D	99·8	199·7	299·7	399·7	499·7	599·7	699·6	799·6	899·6	999·5	1099·3	
		O	5·55	10·00	13·33	15·55	16·66	16·66	15·55	13·33	10·00	5·55	0·0	
1200	3° 49′ 11″	D	99·8	199·7	299·6	399·6	499·6	599·5	699·5	799·5	899·5	999·4	1099·3	1199·1
		O	6·11	11·11	15·00	17·77	19·43	19·98	19·43	17·77	15·00	11·11	6·11	0·0
1300	4° 8′ 17″		1298·9 length of chord.											
1400	4° 27′ 23″		1398·6 ditto.											
1500	4° 46′ 29″		1498·3 ditto.											
1600	5° 5′ 35″		1597·9 ditto.											
1700	5° 24′ 40″		1697·5 ditto.											
1800	5° 43′ 46″		1797·0 ditto.											
1900	6° 2′ 52″		1896·5 ditto.											
2000	6° 21′ 58″		1995·9 ditto.											
2500	7° 57′ 28″		2492·0 ditto.											
3000	9° 32′ 57″		2986·2 ditto.											
4000	12° 43′ 57″		3967·2 ditto.											
5000	15° 54′ 56″		4936·1 ditto.											
6000	19° 5′ 55″		5889·6 ditto.											
50	0° 9′ 33·0″		50·00 ditto.											
10	0° 1′ 54·6″		10·00 ditto.											
1	0° 0′ 11·46″		1·00 ditto.											
To intermediate points.			25	50	75									
		O	0·10	0·14	0·10									
Method No. 4....			1st.	2nd.										
		D	100	100										
		O	0·55	1·11										

TABLE XLV. RADIUS 10,000. (CHORDS.)

LENGTH OF ARC.	TANGENTIAL ANGLE.		LENGTHS ROUND ARCS, WITH RIGHT-ANGLED OFFSETS (O) THERETO FROM DISTANCES (D) ON CHORDS.											
			100	200	300	400	500	600	700	800	900	1000	1100	1200
100	0° 17′ 11″	D	100											
		O	0·0											
200	0° 34′ 23″	D	100	200										
		O	0·50	0·0										
300	0° 51′ 34″	D	100	200	300									
		O	1·00	1·00	0·0									
400	1° 8′ 45″	D	99·99	200	300	400								
		O	1·50	2·00	1·50	0·0								
500	1° 25′ 57″	D	99·98	200	300	400	500							
		O	2·00	3·00	3·00	2·00	0·0							
600	1° 43′ 8″	D	99·97	200	300	400	500	599·9						
		O	2·50	4·00	4·50	4·00	2·50	0·0						
700	2° 0′ 19″	D	99·96	199·9	299·9	399·9	499·9	599·9	699·9					
		O	3·00	5·00	6·00	6·00	5·00	3·00	0·0					
800	2° 17′ 31″	D	99·94	199·9	299·9	399·9	499·9	599·8	699·8	799·8				
		O	3·50	6·00	7·50	8·00	7·50	6·00	3·50	0·0				
900	2° 34′ 42″	D	99·92	199·9	299·8	399·8	499·8	599·8	699·8	799·8	899·7			
		O	4·00	7·00	9·00	10·00	10·00	9·00	7·00	4·00	0·0			
1000	2° 51′ 53″	D	99·90	199·8	299·8	399·8	499·8	599·8	699·8	799·8	899·7	999·6		
		O	4·50	8·00	10·50	12·00	12·50	12·00	10·50	8·00	4·50	0·0		
1100	3° 9′ 5″	D	99·88	199·8	299·8	399·7	499·7	599·7	699·7	799·7	899·7	999·6	1099·5	
		O	5·00	9·00	12·00	14·00	15·00	15·00	14·00	12·00	9·00	5·00	0·0	
1200	3° 26′ 16″	D	99·85	199·7	299·7	399·6	499·6	599·6	699·6	799·6	899·6	999·5	1099·4	1199·3
		O	5·50	10·00	13·50	16·00	17·50	18·00	17·50	16·00	13·50	10·00	5·50	0·0
1300	3° 43′ 27″		1299·1 length of chord.											
1400	4° 0′ 39″		1398·9 ditto.											
1500	4° 17′ 50″		1498·6 ditto.											
1600	4° 35′ 1″		1598·3 ditto.											
1700	4° 52′ 13″		1698·0 ditto.											
1800	5° 9′ 24″		1797·6 ditto.											
1900	5° 26′ 35″		1897·2 ditto.											
2000	5° 43′ 46″		1996·7 ditto.											
2500	7° 9′ 43″		2493·5 ditto.											
3000	8° 35′ 40″		2988·8 ditto.											
4000	11° 27′ 33″		3973·4 ditto.											
5000	14° 19′ 26″		4948·1 ditto.											
6000	17° 11′ 19″		5910·4 ditto.											
50	0° 8′ 35·7″		50·00 ditto.											
10	0° 1′ 43·1″		10·00 ditto.											
1	0° 0′ 10·31″		1·00 ditto.											
To intermediate points.		O	25 0·09	50 0·12	75 0·09									
Method No. 4....		D	1st. 100	2nd. 100										
		O	0·50	1·00										

TABLE XLVI. RADIUS **11,000.** (CHORDS.)

LENGTH OF ARC.	TANGENTIAL ANGLE.		LENGTHS ROUND ARCS, WITH RIGHT-ANGLED OFFSETS (O) THERETO FROM DISTANCES (D) ON CHORDS.											
			100	200	300	400	500	600	700	800	900	1000	1100	1200
100	0° 15′ 38″	D	100											
		O	0·0											
200	0° 31′ 15″	D	100	200										
		O	0·45	0·0										
300	0° 46′ 53″	D	100	200	300									
		O	0·91	0·91	0·0									
400	1° 2′ 30″	D	100	200	300	400								
		O	1·36	1·82	1·36	0·0								
500	1° 18′ 8″	D	100	200	300	400	500							
		O	1·82	2·73	2·73	1·82	0·0							
600	1° 33′ 45″	D	100	200	300	400	499·9	599·9						
		O	2·27	3·63	4·08	3·63	2·27	0·0						
700	1° 49′ 23″	D	100	200	299·9	399·9	499·9	599·9	699·9					
		O	2·73	4·55	5·46	5·46	4·55	2·73	0·0					
800	2° 5′ 0″	D	100	199·9	299·9	399·9	499·9	599·9	699·9	799·8				
		O	3·18	5·45	6·81	7·27	6·81	5·45	3·18	0·0				
900	2° 20′ 38″	D	99·9	199·9	299·9	399·9	499·9	599·9	699·9	799·8	899·7			
		O	3·63	6·36	8·18	9·09	9·09	8·18	6·36	3·63	0·0			
1000	2° 36′ 16″	D	99·9	199·9	299·9	399·8	499·8	599·8	699·8	799·8	899·7	999·6		
		O	4·09	7·27	9·54	10·90	11·35	10·90	9·54	7·27	4·09	0·0		
1100	2° 51′ 53″	D	99·9	199·8	299·8	399·8	499·8	599·8	699·8	799·8	899·7	999·6	1099·5	
		O	4·54	8·17	10·90	12·72	13·63	13·63	12·72	10·90	8·17	4·54	0·0	
1200	3° 7′ 31″	D	99·9	199·8	299·8	399·7	499·7	599·7	699·7	799·7	899·6	999·6	1099·5	1199·4
		O	5·00	9·09	12·27	14·54	15·90	16·35	15·90	14·54	12·27	9·09	5·00	0·0
1300	3° 23′ 8″		1299·3 length of chord.											
1400	3° 38′ 46″		1399·1 ditto.											
1500	3° 54′ 23″		1498·8 ditto.											
1600	4° 10′ 1″		1598·6 ditto.											
1700	4° 25′ 38″		1698·3 ditto.											
1800	4° 41′ 16″		1798·0 ditto.											
1900	4° 56′ 54″		1897·6 ditto.											
2000	5° 12′ 31″		1997·2 ditto.											
2500	6° 30′ 39″		2494·6 ditto.											
3000	7° 48′ 47″		2990·7 ditto.											
4000	10° 25′ 3″		3978·0 ditto.											
5000	13° 1′ 18″		4957·0 ditto.											
6000	15° 37′ 34″		5926·0 ditto.											
50	0° 7′ 48·8″		50·00 ditto.											
10	0° 1′ 33·8″		10·00 ditto.											
1	0° 0′ 9·38″		1·00 ditto.											
To intermediate points.		O	25 0·08	50 0·11	75 0·08									
Method No. 4...		D	1st. 100	2nd. 100										
		O	0·45	0·91										

TABLE XLVII. RADIUS **12,000.** (CHORDS.)

LENGTH OF ARC.	TANGENTIAL ANGLE.	LENGTHS ROUND ARCS, WITH RIGHT-ANGLED OFFSETS (O) THERETO FROM DISTANCES (D) ON CHORDS.											
			100	200	300	400	500	600	700	800	900	1000	1100	1200
100	0° 14′ 19″	D	100											
		O	0·0											
200	0° 28′ 39″	D	100	200										
		O	0·42	0·0										
300	0° 42′ 58″	D	100	200	300									
		O	0·83	0·83	0·0									
400	0° 57′ 18″	D	99·99	200	300	400								
		O	1·25	1·66	1·25	0·0								
500	1° 11′ 37″	D	99·99	200	300	400	500							
		O	1·66	2·50	2·50	1·66	0·0							
600	1° 25′ 57″	D	99·98	200	300	400	500	599·9						
		O	2·08	3·33	3·75	3·33	2·08	0·0						
700	1° 40′ 16″	D	99·97	200	300	400	500	599·9	699·9					
		O	2·50	4·16	5·00	5·00	4·16	2·50	0·0					
800	1° 54′ 36″	D	99·96	199·9	299·9	399·9	499·9	599·9	699·9	799·9				
		O	2·91	5·00	6·25	6·66	6·25	5·00	2·91	0·0				
900	2° 8′ 55″	D	99·95	199·9	299·9	399·9	499·9	599·9	699·9	799·9	899·8			
		O	3·33	5·83	7·50	8·33	8·33	7·50	5·83	3·33	0·0			
1000	2° 23′ 14″	D	99·93	199·9	299·9	399·9	499·9	599·9	699·9	799·8	899·8	999·7		
		O	3·75	6·66	8·75	10·00	10·42	10·00	8·75	6·66	3·75	0·0		
1100	2° 37′ 34″	D	99·91	199·8	299·8	399·8	499·8	599·8	699·8	799·8	899·8	999·7	1099·6	
		O	4·16	7·50	10·00	11·66	12·50	12·50	11·66	10·00	7·50	4·16	0·0	
1200	2° 51′ 53″	D	99·90	199·8	299·8	399·8	499·8	599·8	699·8	799·8	899·7	999·7	1099·6	1199·5
		O	4·58	8·33	11·24	13·32	14·57	15·00	14·57	13·32	11·24	8·33	4·58	0·0
1300	3° 6′ 13″	1299·3 length of chord.												
1400	3° 20′ 32″	1399·2 ditto.												
1500	3° 34′ 52″	1499·0 ditto.												
1600	3° 49′ 11″	1598·8 ditto.												
1700	4° 3′ 30″	1698·6 ditto.												
1800	4° 17′ 50″	1798·3 ditto.												
1900	4° 32′ 9″	1898·0 ditto.												
2000	4° 46′ 29″	1997·7 ditto.												
2500	5° 58′ 6″	2495·5 ditto.												
3000	7° 9′ 43″	2992·1 ditto.												
4000	9° 32′ 57″	3981·5 ditto.												
5000	11° 56′ 12″	4964·0 ditto.												
6000	14° 19′ 26″	5937·7 ditto.												
50	0° 7′ 9·7″	50·00 ditto.												
10	0° 1′ 25·9″	10·00 ditto.												
1	0° 0′ 8·59″	1·00 ditto.												
To intermediate points.		O	25 0·08	50 0·10	75 0·08									
Method No. 4....		D	1st. 100	2nd. 100										
		O	0·42	0·83										

TABLE XLVIII. RADIUS **14,000.** (CHORDS.)

LENGTH OF ARC.	TANGENTIAL ANGLE.		LENGTHS ROUND ARCS, WITH RIGHT-ANGLED OFFSETS (O) THERETO FROM DISTANCES (D) ON CHORDS.											
			100	200	300	400	500	600	700	800	900	1000	1100	1200
100	0° 12′ 17″	D	100											
		O	0·0											
200	0° 24′ 33″	D	100	200										
		O	0·36	0·0										
300	0° 36′ 50″	D	100	200	300									
		O	0·71	0·71	0·0									
400	0° 49′ 7″	D	100	200	300	400								
		O	1·07	1·43	1·07	0·0								
500	1° 1′ 23″	D	100	200	300	400	500							
		O	1·43	2·14	2·14	1·43	0·0							
600	1° 13′ 40″	D	100	200	300	400	500	600						
		O	1·78	2·85	3·21	2·85	1·78	0·0						
700	1° 25′ 57″	D	100	200	300	400	500	600	699·9					
		O	2·14	3·57	4·28	4·28	3·57	2·14	0·0					
800	1° 38′ 13″	D	100	200	300	400	499·9	599·9	699·9	799·9				
		O	2·50	4·28	5·35	5·70	5·35	4·28	2·50	0·0				
900	1° 50′ 30″	D	100	199·9	299·9	399·9	499·9	599·9	699·9	799·9	899·8			
		O	2·86	5·00	6·43	7·14	7·14	6·43	5·00	2·86	0·0			
1000	2° 2′ 47″	D	99·9	199·9	299·9	399·9	499·9	599·9	699·9	799·9	899·8	999·8		
		O	3·21	5·71	7·50	8·57	8·92	8·57	7·50	5·71	3·21	0·0		
1100	2° 15′ 3″	D	99·9	199·9	299·9	399·9	499·9	599·9	699·9	799·8	899·8	999·8	1099·7	
		O	3·57	6·43	8·57	10·00	10·71	10·71	10·00	8·57	6·43	3·57	0·0	
1200	2° 27′ 20″	D	99·9	199·9	299·9	399·9	499·9	599·9	699·9	799·8	899·8	999·7	1099·7	1199·6
		O	3·93	7·14	9·64	11·42	12·50	12·85	12·50	11·42	9·64	7·14	3·93	0·0
1300	2° 39′ 37″		1299·5 length of chord.											
1400	2° 51′ 53″		1399·4 ditto.											
1500	3° 4′ 10″		1499·3 ditto.											
1600	3° 16′ 26″		1599·1 ditto.											
1700	3° 28′ 43″		1699·0 ditto.											
1800	3° 41′ 0″		1798·8 ditto.											
1900	3° 53′ 16″		1898·6 ditto.											
2000	4° 5′ 33″		1998·3 ditto.											
2500	5° 6′ 56″		2496·7 ditto.											
3000	6° 8′ 20″		2994·3 ditto.											
4000	8° 11′ 6″		3986·4 ditto.											
5000	10° 13′ 53″		4973·4 ditto.											
6000	12° 16′ 39″		5954·4 ditto.											
50	0° 6′ 8·3″		50·00 ditto.											
10	0° 1′ 13·7″		10·00 ditto.											
1	0° 0′ 7·37″		1·00 ditto.											
To intermediate points.			25	50	75									
		O	0·07	0·09	0·07									
Method No. 4....			1st.	2nd.										
		D	100	100										
		O	0·36	0·71										

TABLE XLIX. RADIUS **16,000.** (CHORDS.)

LENGTH OF ARC.	TANGENTIAL ANGLE.		LENGTHS ROUND ARCS, WITH RIGHT-ANGLED OFFSETS (O) THERETO FROM DISTANCES (D) ON CHORDS.											
			100	200	300	400	500	600	700	800	900	1000	1100	1200
100	0° 10′ 45″	D	100											
		O	0·0											
200	0° 21′ 29″	D	100	200										
		O	0·31	0·0										
300	0° 32′ 14″	D	100	200	300									
		O	0·62	0·62	0·0									
400	0° 42′ 58″	D	100	200	300	400								
		O	0·94	1·25	0·94	0·0								
500	0° 53′ 43″	D	100	200	300	400	500							
		O	1·25	1·87	1·87	1·25	0·0							
600	1° 4′ 27″	D	100	200	300	400	500	600						
		O	1·56	2·50	2·81	2·50	1·56	0·0						
700	1° 15′ 12″	D	100	200	300	400	500	600	700					
		O	1·87	3·12	3·75	3·75	3·12	1·87	0·0					
800	1° 25′ 57″	D	100	200	300	400	500	600	700	799·9				
		O	2·19	3·75	4·69	5·00	4·69	3·75	2·19	0·0				
900	1° 36′ 41″	D	100	200	300	400	500	600	699·9	799·9	899·9			
		O	2·50	4·37	5·62	6·25	6·25	5·62	4·37	2·50	0·0			
1000	1° 47′ 26″	D	100	199·9	299·9	399·9	499·9	599·9	699·9	799·9	899·9	999·8		
		O	2·81	5·00	6·56	7·50	7·81	7·50	6·56	5·00	2·81	0·0		
1100	1° 58′ 10″	D	100	199·9	299·9	399·9	499·9	599·9	699·9	799·9	899·9	999·8	1099·8	
		O	3·12	5·62	7·50	8·75	9·37	9·37	8·75	7·50	5·62	3·12	0·0	
1200	2° 8′ 55″	D	99·9	199·9	299·8	399·8	499·8	599·8	699·8	799·8	899·8	999·8	1099·8	1199·7
		O	3·44	6·25	8·44	10·00	10·94	11·25	10·94	10·00	8·44	6·25	3·44	0·0
1300	2° 19′ 40″		1299·7 length of chord.											
1400	2° 30′ 24″		1399·6 ditto.											
1500	2° 41′ 9″		1499·5 ditto.											
1600	2° 51′ 53″		1599·4 ditto.											
1700	3° 2′ 38″		1699·2 ditto.											
1800	3° 13′ 22″		1799·1 ditto.											
1900	3° 24′ 7″		1898·9 ditto.											
2000	3° 34′ 52″		1998·7 ditto.											
2500	4° 28′ 34″		2497·5 ditto.											
3000	5° 22′ 17″		2995·7 ditto.											
4000	7° 9′ 43″		3989·7 ditto.											
5000	8° 57′ 9″		4979·7 ditto.											
6000	10° 44′ 35″		5965·1 ditto.											
50	0° 5′ 22·3″		50·00 ditto.											
10	0° 1′ 4·5″		10·00 ditto.											
1	0° 0′ 6·45″		1·00 ditto.											
To intermediate points.		O	25 0·06	50 0·08	75 0·06									
Method No. 4....		D	1st. 100	2nd. 100										
		O	0·31	0·62										

TABLE L. RADIUS 20,000. (CHORDS.)

LENGTH OF ARC.	TANGENTIAL ANGLE.		LENGTHS ROUND ARCS, WITH RIGHT-ANGLED OFFSETS (O) THERETO FROM DISTANCES (D) ON CHORDS.											
			100	200	300	400	500	600	700	800	900	1000	1100	1200
100	0° 8′ 36″	D	100											
		O	0·0											
200	0° 17′ 11″	D	100	200										
		O	0·25	0·0										
300	0° 25′ 47″	D	100	200	300									
		O	0·50	0·50	0·0									
400	0° 34′ 23″	D	100	200	300	400								
		O	0·75	1·00	0·75	0·0								
500	0° 42′ 58″	D	100	200	300	400	500							
		O	1·00	1·50	1·50	1·00	0·0							
600	0° 51′ 34″	D	99·99	200	300	400	500	600						
		O	1·25	2·00	2·25	2·00	1·25	0·0						
700	1° 0′ 10″	D	99.99	200	300	400	500	600	700					
		O	1·50	2·50	3·00	3·00	2·50	1·50	0·0					
800	1° 8′ 45″	D	99·98	200	300	400	500	600	700	800				
		O	1·75	3·00	3·75	4·00	3·75	3·00	1·75	0·0				
900	1° 17′ 21″	D	99·98	200	300	400	500	600	700	800	899·9			
		O	2·00	3·50	4·50	5·00	5·00	4·50	3·50	2·00	0·0			
1000	1° 25′ 57″	D	99·97	199·9	299·9	399·9	499·9	599·9	699·9	799·9	899·9	999·9		
		O	2·25	4·00	5·25	6·00	6·25	6·00	5·25	4·00	2·25	0·0		
1100	1° 34′ 32″	D	99·97	199·9	299·9	399·9	499·9	599·9	699·9	799·9	899·9	999·9	1099·9	
		O	2·50	4·50	6·00	7·00	7·50	7·50	7·00	6·00	4·50	2·50	0·0	
1200	1° 43′ 8″	D	99·96	199·9	299·9	399·9	499·9	599·9	699·9	799·9	899·9	999·9	1099·9	1199·8
		O	2·75	5·00	6·75	8·00	8·75	9·00	8·75	8·00	6·75	5·00	2·75	0·0
1300	1° 51′ 44″		1299·8 length of chord.											
1400	2° 0′ 19″		1399·7 ditto.											
1500	2° 8′ 55″		1499·7 ditto.											
1600	2° 17′ 31″		1599·6 ditto.											
1700	2° 26′ 6″		1699·5 ditto.											
1800	2° 34′ 42″		1799·4 ditto.											
1900	2° 43′ 18″		1899·3 ditto.											
2000	2° 51′ 53″		1999·2 ditto.											
2500	3° 34′ 52″		2498·4 ditto.											
3000	4° 17′ 50″		2997·2 ditto.											
4000	5° 43′ 46″		3993·4 ditto.											
5000	7° 9′ 43″		4987·0 ditto.											
6000	8° 35′ 40″		5977·6 ditto.											
50	0° 4′ 17·8″		50·00 ditto.											
10	0° 0′ 51·6″		10·00 ditto.											
1	0° 0′ 5·16″		1·00 ditto.											
To intermediate points.		O	25 0·05	50 0·06	75 0·05									
Method No. 4...		D	1st. 100	2nd. 100										
		O	0·25	0·50										

TABLE LI. RADIUS 24,000. (CHORDS.)

LENGTH OF ARC.	TANGENTIAL ANGLE.		LENGTHS ROUND ARCS, WITH RIGHT-ANGLED OFFSETS (O) THERETO FROM DISTANCES (D) ON CHORDS.											
			100	200	300	400	500	600	700	800	900	1000	1100	1200
100	0° 7′ 10″	D	100											
		O	0·0											
200	0° 14′ 19″	D	100	200										
		O	0·21	0·0										
300	0° 21′ 29″	D	100	200	300									
		O	0·42	0·42	0·0									
400	0° 28′ 39″	D	100	200	300	400								
		O	0·63	0·83	0·63	0·0								
500	0° 35′ 49″	D	100	200	300	400	500							
		O	0·83	1·25	1·25	0·83	0·0							
600	0° 42′ 58″	D	100	200	300	400	500	600						
		O	1·04	1·67	1·88	1·67	1·04	0·0						
700	0° 50′ 8″	D	99·99	200	300	400	500	600	700					
		O	1·25	2·08	2·50	2·50	2·08	1·25	0·0					
800	0° 57′ 18″	D	99·99	200	300	400	500	600	700	800				
		O	1·46	2·50	3·13	3·33	3·13	2·50	1·46	0·0				
900	1° 4′ 27″	D	99·99	200	300	400	500	600	700	800	900			
		O	1·66	2·91	3·75	4·17	4·17	3·75	2·91	1·66	0·0			
1000	1° 11′ 37″	D	99·98	200	300	400	500	600	700	800	899·9	999·9		
		O	1·87	3·33	4·37	5·00	5·21	5·00	4·37	3·33	1·87	0·0		
1100	1° 18′ 47″	D	99·98	200	300	400	500	600	700	799·9	899·9	999·9	1099·9	
		O	2·08	3·75	5·00	5·83	6·25	6·25	5·83	5·00	3·75	2·08	0·0	
1200	1° 25′ 57″	D	99·98	200	300	400	500	600	699·9	799·9	899·9	999·9	1099·9	1199·9
		O	2·29	4·16	5·62	6·66	7·29	7·50	7·29	6·66	5·62	4·16	2·29	0·0
1300	1° 33′ 6″		1299·8 length of chord.											
1400	1° 40′ 16″		1399·8 ditto.											
1500	1° 47′ 26″		1499·8 ditto.											
1600	1° 54′ 36″		1599·7 ditto.											
1700	2° 1′ 45″		1699·7 ditto.											
1800	2° 8′ 55″		1799·6 ditto.											
1900	2° 16′ 5″		1899·5 ditto.											
2000	2° 23′ 14″		1999·4 ditto.											
2500	2° 59′ 3″		2498·9 ditto.											
3000	3° 34′ 52″		2998·0 ditto.											
4000	4° 46′ 29″		3995·4 ditto.											
5000	5° 58′ 6″		4991·0 ditto.											
6000	7° 9′ 43″		5984·2 ditto.											
50	0° 3′ 34·9″		50·00 ditto.											
10	0° 0′ 43·0″		10·00 ditto.											
1	0° 0′ 4·30″		1·00 ditto.											
To intermediate points.		O	25 0·04	50 0·05	75 0·04									
Method No. 4....		D	1st. 100	2nd. 100										
		O	0·21	0·42										

TABLE LII. RADIUS 32,000. (CHORDS.)

LENGTH OF ARC.	TANGENTIAL ANGLE.		LENGTHS ROUND ARCS, WITH RIGHT-ANGLED OFFSETS (O) THERETO FROM DISTANCES (D) ON CHORDS.											
			100	200	300	400	500	600	700	800	900	1000	1100	1200
100	0° 5′ 22″	D	100											
		O	0·0											
200	0° 10′ 45″	D	100	200										
		O	0·16	0·0										
300	0° 16′ 7″	D	100	200	300									
		O	0·31	0·31	0·0									
400	0° 21′ 29″	D	100	200	300	400								
		O	0·47	0·62	0·47	0·0								
500	0° 26′ 52″	D	100	200	300	400	500							
		O	0·62	0·93	0·93	0·62	0·0							
600	0° 32′ 14″	D	100	200	300	400	500	600						
		O	0·78	1·25	1·41	1·25	0·78	0·0						
700	0° 37′ 36″	D	100	200	300	400	500	600	700					
		O	0·94	1·56	1·87	1·87	1·56	0·94	0·0					
800	0° 42′ 58″	D	100	200	300	400	500	600	700	800				
		O	1·10	1·88	2·35	2·50	2·35	1·88	1·10	0·0				
900	0° 48′ 21″	D	100	200	300	400	500	600	700	800	900			
		O	1·25	2·19	2·81	3·12	3·12	2·81	2·19	1·25	0·0			
1000	0° 53′ 43″	D	100	200	300	400	500	600	700	800	900	1000		
		O	1·41	2·50	3·28	3·75	3·91	3·75	3·28	2·50	1·41	0·0		
1100	0° 59′ 5″	D	100	200	300	400	500	600	700	800	900	1000	1099·9	
		O	1·56	2·81	3·75	4·37	4·68	4·68	4·37	3·75	2·81	1·56	0·0	
1200	1° 4′ 27″	D	100	200	300	400	500	600	700	800	900	999·9	1099·9	1199·9
		O	1·72	3·13	4·23	5·00	5·47	5·63	5·47	5·00	4·23	3·13	1·72	0·0
1300	1° 9′ 50″		1299·9 length of chord.											
1400	1° 15′ 12″		1399·9 ditto.											
1500	1° 20′ 34″		1499·9 ditto.											
1600	1° 25′ 57″		1599·9 ditto.											
1700	1° 31′ 19″		1699·8 ditto.											
1800	1° 36′ 41″		1799·8 ditto.											
1900	1° 42′ 4″		1899·7 ditto.											
2000	1° 47′ 26″		1999·7 ditto.											
2500	2° 14′ 17″		2499·4 ditto.											
3000	2° 41′ 9″		2998·9 ditto.											
4000	3° 34′ 52″		3997·4 ditto.											
5000	4° 28′ 34″		4994·9 ditto.											
6000	5° 22′ 17″		5991·3 ditto.											
50	0° 2′ 41·2″		50·00 ditto.											
10	0° 0′ 32·2″		10·00 ditto.											
1	0° 0′ 3·22″		1·00 ditto.											
To intermediate points.		O	25 0·03	50 0·04	75 0·03									
Method No. 4....			1st.	2nd.										
		D	100	100										
		O	0·16	0·31										

TABLE LIII. RADIUS 40,000. (CHORDS.)

LENGTH OF ARC.	TANGENTIAL ANGLE.		LENGTHS ROUND ARCS, WITH RIGHT-ANGLED OFFSETS (O) THERETO FROM DISTANCES (D) ON CHORDS.											
			100	200	300	400	500	600	700	800	900	1000	1100	1200
100	0° 4′ 18″	D	100											
		O	0·0											
200	0° 8′ 36″	D	100	200										
		O	0·12	0·0										
300	0° 12′ 53″	D	100	200	300									
		O	0·25	0·25	0·0									
400	0° 17′ 11″	D	100	200	300	400								
		O	0·37	0·50	0·37	0·0								
500	0° 21′ 29″	D	100	200	300	400	500							
		O	0·50	0·75	0·75	0·50	0·0							
600	0° 25′ 47″	D	100	200	300	400	500	600						
		O	0·62	1·00	1·12	1·00	0·62	0·0						
700	0° 30′ 5″	D	100	200	300	400	500	600	700					
		O	0·75	1·25	1·50	1·50	1·25	0·75	0·0					
800	0° 34′ 23″	D	100	200	300	400	500	600	700	800				
		O	0·87	1·50	1·87	2·00	1·87	1·50	0·87	0·0				
900	0° 38′ 40″	D	100	200	300	400	500	600	700	800	900			
		O	1·00	1·75	2·25	2·50	2·50	2·25	1·75	1·00	0·0			
1000	0° 42′ 58″	D	100	200	300	400	500	600	700	800	900	1000		
		O	1·12	2·00	2·62	3·00	3·12	3·00	2·62	2·00	1·12	0·0		
1100	0° 47′ 16″	D	100	200	300	400	500	600	700	800	900	1000	1100	
		O	1·25	2·25	3·00	3·50	3·75	3·75	3·50	3·00	2·25	1·25	0·0	
1200	0° 51′ 34″	D	100	200	300	400	500	600	700	800	900	1000	1100	1200
		O	1·37	2·50	3·37	4·00	4·37	4·50	4·37	4·00	3·37	2·50	1·37	0·0
1300	0° 55′ 52″		1299·9 length of chord.											
1400	1° 0′ 10″		1399·9		ditto.									
1500	1° 4′ 27″		1499·9		ditto.									
1600	1° 8′ 45″		1599·9		ditto.									
1700	1° 13′ 3″		1699·9		ditto.									
1800	1° 17′ 21″		1799·9		ditto.									
1900	1° 21′ 39″		1899·8		ditto.									
2000	1° 25′ 57″		1999·8		ditto.									
2500	1° 47′ 26″		2499·6		ditto.									
3000	2° 8′ 55″		2999·3		ditto.									
4000	2° 51′ 53″		3998·4		ditto.									
5000	3° 34′ 52″		4996·8		ditto.									
6000	4° 17′ 50″		5994·4		ditto.									
50	0° 2′ 8·9″		50·00		ditto.									
10	0° 0′ 25·8″		10·00		ditto.									
1	0° 0′ 2·58″		1·00		ditto.									
To intermediate points.		O	25 0·02	50 0·03	75 0·02									
Method No. 4....			1st.	2nd.										
		D	100	100										
		O	0·12	0·25										

TABLE LIV. **RADIUS 132.** (CHORDS.)

(132 Feet = 2 Imperial Chains.)

LENGTH OF ARC.	TANGENTIAL ANGLE.		LENGTHS ROUND ARCS, WITH RIGHT-ANGLED OFFSETS (O) THERETO FROM DISTANCES (D) ON CHORDS.							
			100	200	300	400	500	600	700	800
100	21° 42′ 10″	D	97·63							
		O	0·00							
200	43° 24′ 21″	D	90·71	181·4						
		O	36·10	0·00						
300	65° 6′ 31″	D	70·93	168·6	239·5					
		O	67·08	67·08	0·00					
400	86° 48′ 42″	D	41·09	131·8	222·5	263·6				
		O	88·56	124·7	88·56	0·00				
500	108° 30′ 52″									
50	10° 51′ 5·2″		49·70 length of chord.							
10	2° 10′ 13·0″		10·00 ditto.							
1	0° 13′ 1·30″		1·00 ditto.							
To intermediate points.		O	25 7·00	50 9·36	75 7·00					
Method No. 4 . .			1st.	2nd.						
		D	90·71	70·93						
		O	36·10	67·08						

TABLE LV. RADIUS 165. (CHORDS.)

(165 Feet = 2½ Imperial Chains.)

LENGTH OF ARC.	TANGENTIAL ANGLE.		LENGTHS ROUND ARCS, WITH RIGHT-ANGLED OFFSETS (O) THERETO FROM DISTANCES (D) ON CHORDS.							
			100	200	300	400	500	600	700	800
100	17° 21′ 44″	D	98·48							
		O	0·00							
200	34° 43′ 29″	D	93·99	188						
		O	29·39	0·00						
300	52° 5′ 13″	D	80·94	179·4	260·4					
		O	56·10	56·10	0·00					
400	69° 26′ 58″	D	60·51	154·5	248·5	309				
		O	77·69	107·1	77·69	0·00				
500	86° 48′ 42″									
50	8° 40′ 52·2″		49·81 length of chord.							
10	1° 44′ 10·4″		10·00 ditto.							
1	0° 10′ 25·04″		1·00 ditto.							
To intermediate points.			25	50	75					
		O	5·63	7·52	5·63					
			1st.	2nd.						
Method No. 4 . .		D	93·99	80·94						
		O	29·39	56·10						

TABLE LVI. RADIUS 198. (CHORDS.)

(198 Feet = 3 Imperial Chains.)

LENGTH OF ARC.	TANGENTIAL ANGLE.		LENGTHS ROUND ARCS, WITH RIGHT-ANGLED OFFSETS (O) THERETO FROM DISTANCES (D) ON CHORDS.							
			100	200	300	400	500	600	700	800
100	14° 28′ 7″	D	98·94							
		O	0·0							
200	28° 56′ 14″	D	95·80	191·6						
		O	24·72	0·0						
300	43° 24′ 21″	D	86·59	185·5	272·1					
		O	47·87	47·87	0·0					
400	57° 52′ 28″	D	71·88	167·7	263·5	335·4				
		O	67·99	92·71	67·99	0·0				
500	72° 20′ 35″	D	52·61	139·2	238·1	324·7	377·3			
		O	83·79	131·7	131·7	83·79	0·0			
600	86° 48′ 42″									
50	7° 14′ 3·5″		49·87	length of chord.						
10	1° 26′ 48·7″		10·00	ditto.						
1	0° 8′ 40·87″		1·00	ditto.						
To intermediate points.			25	50	75					
		O	4·70	6·28	4·70					
			1st.	2nd.						
Method No. 4.		D	95·80	86·59						
		O	24·72	47·87						

TABLE LVII. RADIUS 231. (CHORDS.)

(231 Feet = 3¼ Imperial Chains.)

LENGTH OF ARC.	TANGENTIAL ANGLE.		LENGTHS ROUND ARCS, WITH RIGHT-ANGLED OFFSETS (O) THERETO FROM DISTANCES (D) ON CHORDS.							
			100	200	300	400	500	600	700	800
100	12° 24′ 6″	D	99·22							
		O	0·0							
200	24° 48′ 12″	D	96·91	193·8						
		O	21·26	0·0						
300	37° 12′ 18″	D	90·07	189·3	279·4					
		O	41·62	41·62	0·0					
400	49° 36′ 24″	D	79·03	175·9	272·8	351·9				
		O	60·00	81·26	60·00	0·0				
500	62° 0′ 30″	D	64·30	154·4	253·6	343·7	408			
		O	75·57	117·2	117·2	75·57	0·0			
600	74° 24′ 36″									
50	6° 12′ 3·0″		49·90 length of chord.							
10	1° 14′ 24·6″		10·00 ditto.							
1	0° 7′ 26·46″		1·00 ditto.							
To intermediate points.			25	50	75					
		O	4·04	5·39	4·04					
			1st.	2nd.						
Method No. 4.		D	96·91	90·07						
		O	21·26	41·62						

TABLE LVIII. RADIUS 264. (CHORDS.)

(264 Feet = 4 Imperial Chains.)

LENGTH OF ARC.	TANGENTIAL ANGLE.		LENGTHS ROUND ARCS, WITH RIGHT-ANGLED OFFSETS (O) THERETO FROM DISTANCES (D) ON CHORDS.							
			100	200	300	400	500	600	700	800
100	10° 51′ 5″	D	99·40							
		O	0·0							
200	21° 42′ 10″	D	97·63	195·3						
		O	18·71	0·0						
300	32° 33′ 16″	D	92·36	191·8	284·1					
		O	36·76	36·76	0·0					
400	43° 24′ 21″	D	83·78	181·4	279	362·8				
		O	53·49	72·20	53·49	0·0				
500	54° 15′ 26″	D	72·22	164·6	264	356·3	428·6			
		O	68·31	105·1	105·1	68·31	0·0			
600	65° 6′ 31″									
700	75° 57′ 36″									
800	86° 48′ 42″									
900	97° 39′ 47″									
1000	108° 30′ 52″									
50	5° 25′ 32·6″		49·92 length of chord.							
10	1° 5′ 6·5″		10·00 ditto.							
1	0° 6′ 30·65″		1·00 ditto.							
To intermediate points.			25	50	75					
		O	3·54	4·73	3·54					
Method No. 4.			1st.	2nd.						
		D	97·63	92·36						
		O	18·71	36·76						

TABLE LIX. **RADIUS 330.** (CHORDS.)

(330 Feet = 5 Imperial Chains.)

LENGTH OF ARC.	TANGENTIAL ANGLE.		LENGTHS ROUND ARCS, WITH RIGHT-ANGLED OFFSETS (O) THERETO FROM DISTANCES (D) ON CHORDS.							
			100	200	300	400	500	600	700	800
100	8° 40′ 52″	D	99·62							
		O	0·0							
200	17° 21′ 44″	D	98·48	197						
		O	15·04	0·0						
300	26° 2′ 37″	D	95·08	194·7	289·8					
		O	29·73	29·73	0·0					
400	34° 43′ 29″	D	89·50	188	286·5	376				
		O	43·74	58·78	43·74	0·0				
500	43° 24′ 21″	D	81·88	177	276·6	371·7	453·5			
		O	56·75	86·48	86·48	56·75	0·0			
600	52° 5′ 13″	D	72·37	161·9	260·3	358·8	448·3	520·7		
		O	68·45	112·2	127·2	112·2	68·45	0·0		
700	60° 46′ 5″									
800	69° 26′ 58″									
900	78° 7′ 50″									
1000	86° 48′ 42″									
50	4° 20′ 26·1″		49·95	length of chord.						
10	0° 52′ 5·2″		10·00	ditto.						
1	0° 5′ 12·52″		1·00	ditto.						
To intermediate points.			25	50	75					
		O	2·83	3·78	2·83					
			1st.	2nd.						
Method No. 4.		D	98·48	95·08						
		O	15·04	29·73						

TABLE LX. RADIUS 396. (CHORDS.)

(396 Feet = 6 Imperial Chains.)

LENGTH OF ARC.	TANGENTIAL ANGLE.		LENGTHS ROUND ARCS, WITH RIGHT-ANGLED OFFSETS (O) THERETO FROM DISTANCES (D) ON CHORDS.							
			100	200	300	400	500	600	700	800
100	7° 14′ 4″	D	99·73							
		O	0·0							
200	14° 28′ 7″	D	98·94	197·9						
		O	12·56	0·0						
300	21° 42′ 10″	D	96·57	196·3	292·9					
		O	24·92	24·92	0·0					
400	28° 56′ 14″	D	92·66	191·6	290·5	383·2				
		O	36·88	49·44	36·88	0·0				
500	36° 10′ 17″	D	87·28	183·8	283·6	380·1	467·4			
		O	48·26	73·18	73·18	48·26	0·0			
600	43° 24′ 21″	D	80·51	173·2	272·1	371	463·7	544·2		
		O	58·86	95·74	108·3	95·74	58·86	0·0		
700	50° 38′ 24″									
800	57° 52′ 28″									
900	65° 6′ 31″									
1000	72° 20′ 35″									
50	3° 37′ 1·8″		49·97	length of chord.						
10	0° 43′ 24·4″		10·00	ditto.						
1	0° 4′ 20·44″		1·00	ditto.						
To intermediate points.		O	25 2·36	50 3·15	75 2·36					
Method No. 4 . .			1st.	2nd.						
		D	98·94	96·57						
		O	12·56	24·92						

TABLE LXI. **RADIUS 462.** (CHORDS.)

(462 Feet = 7 Imperial Chains.)

LENGTH OF ARC.	TANGENTIAL ANGLE.		LENGTHS ROUND ARCS, WITH RIGHT-ANGLED OFFSETS (O) THERETO FROM DISTANCES (D) ON CHORDS.							
			100	200	300	400	500	600	700	800
100	6° 12′ 3″	D	99·80							
		O	0·0							
200	12° 24′ 6″	D	99·22	198·4						
		O	10·80	0·0						
300	18° 36′ 9″	D	97·48	197·3	294·8					
		O	21·43	21·43	0·0					
400	24° 48′ 12″	D	94·59	193·8	293	387·6				
		O	31·84	42·64	31·84	0·0				
500	31° 0′ 15″	D	90·60	188·1	287·9	385·4	476			
		O	41·87	63·30	63·30	41·87	0·0			
600	37° 12′ 18″	D	85·55	180·1	279·4	378·6	473·2	558·7		
		O	51·41	83·25	94·05	83·25	51·41	0·0		
700	43° 24′ 21″									
800	49° 36′ 24″									
900	55° 48′ 27″									
1000	62° 0′ 30″									
50	3° 6′ 1·5″		49·98 length of chord.							
10	0° 37′ 12·3″		10·00 ditto.							
1	0° 3′ 43·23″		1·00 ditto.							
To intermediate points.			25	50	75					
		O	2·03	2·70	2·03					
Method No. 4 . .			1st.	2nd.						
		D	99·22	97·48						
		O	10·80	21·43						

TABLE LXII. RADIUS 528. (CHORDS.)

(528 Feet = 8 Imperial Chains.)

LENGTH OF ARC.	TANGENTIAL ANGLE.		LENGTHS ROUND ARCS, WITH RIGHT-ANGLED OFFSETS (O) THERETO FROM DISTANCES (D) ON CHORDS.							
			100	200	300	400	500	600	700	800
100	5° 25′ 33″	D	99·85							
		O	0·0							
200	10° 51′ 5″	D	99·40	198·8						
		O	9·44	0·0						
300	16° 16′ 38″	D	98·06	197·9	296					
		O	18·80	18·80	0·0					
400	21° 42′ 10″	D	95·85	195·2	294·6	390·5				
		O	27·99	37·43	27·99	0·0				
500	27° 7′ 43″	D	92·77	190·8	290·7	388·7	481·5			
		O	36·92	55·72	55·72	36·92	0·0			
600	32° 33′ 16″	D	88·86	184·7	284·1	383·5	479·4	568·2		
		O	45·53	73·52	82·96	73·52	45·53	0·0		
700	37° 58′ 48″	D	84·16	176·9	275	374·8	472·9	565·7	649·8	
		O	53·73	90·65	109·4	109·4	90·65	53·73	0·0	
800	43° 24′ 21″									
900	48° 49′ 53″									
1000	54° 15′ 26″									
50	2° 42′ 46·3″		49·98 length of chord.							
10	0° 32′ 33·3″		10·00 ditto.							
1	0° 3′ 15·33″		1·00 ditto.							
To intermediate points.			25	50	75					
		O	1·77	2·37	1·77					
Method No. 4.			1st.	2nd.						
		D	99·40	98·06						
		O	9·44	18·80						

TABLE LXIII. RADIUS 594. (CHORDS.)

(594 Feet = 9 Imperial Chains.)

LENGTH OF ARC.	TANGENTIAL ANGLE.		LENGTHS ROUND ARCS, WITH RIGHT-ANGLED OFFSETS (O) THERETO FROM DISTANCES (D) ON CHORDS.							
			100	200	300	400	500	600	700	800
100	4° 49′ 22″	D	99·88							
		O	0·0							
200	9° 38′ 45″	D	99·53	199·1						
		O	8·40	0·0						
300	14° 28′ 7″	D	98·47	198·4	296·8					
		O	16·74	16·74	0·0					
400	19° 17′ 29″	D	96·71	196·2	295·8	392·5				
		O	24·96	33·36	24·96	0·0				
500	24° 6′ 52″	D	94·27	192·7	292·6	391·1	485·4			
		O	33·00	49·74	49·74	33·00	0·0			
600	28° 56′ 14″	D	91·17	187·9	287·4	386·9	483·6	574·8		
		O	40·81	65·77	74·17	65·77	40·81	0·0		
700	33° 45′ 36″	D	87·41	181·7	280·1	380	478·5	572·8	660·2	
		O	48·33	81·33	98·07	98·07	81·33	48·33	0·0	
800	38° 34′ 59″									
900	43° 24′ 21″									
1000	48° 13′ 43″									
50	2° 24′ 41·2″		49·99	length of chord.						
10	0° 28′ 56·2″		10·00	ditto.						
1	0° 2′ 53·62″		1·00	ditto.						
To intermediate points.		O	25	50	75					
			1·58	2·10	1·58					
			1st.	2nd.						
Method No. 4.		D	99·53	98·47						
		O	8·40	16·74						

TABLE LXIV. RADIUS 660. (CHORDS.)

(660 Feet = 10 Imperial Chains.)

LENGTH OF ARC.	TANGENTIAL ANGLE.		LENGTHS ROUND ARCS, WITH RIGHT-ANGLED OFFSETS (O) THERETO FROM DISTANCES (D) ON CHORDS.							
			100	200	300	400	500	600	700	800
100	4° 20′ 26″	D	99·90							
		O	0·0							
200	8° 40′ 52″	D	99·62	199·2						
		O	7·56	0·0						
300	13° 1′ 18″	D	98·76	198·7	297·4					
		O	15·08	15·08	0·0					
400	17° 21′ 44″	D	97·34	197	296·6	393·9				
		O	22·51	30·07	22·51	0·0				
500	21° 42′ 10″	D	95·35	194·1	294	392·8	488·1			
		O	29·81	44·89	44·89	29·81	0·0			
600	26° 2′ 37″	D	92·82	190·2	289·8	389·4	486·7	579·5		
		O	36·94	59·45	67·01	59·45	36·94	0·0		
700	30° 23′ 3″	D	89·76	185·1	283·9	383·8	482·5	577·9	667·6	
		O	43·86	73·67	88·75	88·75	73·67	43·86	0·0	
800	34° 43′ 29″	D	86·18	179	276·3	376	475·6	572·9	665·7	751·9
		O	50·54	87·48	110·0	117·6	110·0	87·48	50·54	0·0
900	39° 3′ 55″		831·9 length of chord.							
1000	43° 24′ 21″		907·0 ditto.							
1100	47° 44′ 47″		977·0 ditto.							
1200	52° 5′ 13″		1041·4 ditto.							
1300	56° 25′ 39″									
1400	60° 46′ 5″									
1500	65° 6′ 31″									
1600	69° 26′ 57″									
1700	73° 47′ 24″									
1800	78° 7′ 50″									
1900	82° 28′ 16″									
2000	86° 48′ 42″									
50	2° 10′ 13·0″		49·99 length of chord.							
10	0° 26′ 2·6″		10·00 ditto.							
1	0° 2′ 36·26″		1·00 ditto.							
To intermediate points.			25	50	75					
		O	1·42	1·89	1·42					
Method . 4. .			1st.	2nd.						
		D	99·62	98·76						

TABLE LXV. RADIUS 990. (CHORDS.)

(990 Feet = 15 Imperial Chains.)

LENGTH OF ARC.	TANGENTIAL ANGLE.		LENGTHS ROUND ARCS, WITH RIGHT-ANGLED OFFSETS (O) THERETO FROM DISTANCES (D) ON CHORDS.									
			100	200	300	400	500	600	700	800	900	1000
100	2° 53′ 37″	D	99·96									
		O	0·0									
200	5° 47′ 15″	D	99·83	199·6								
		O	5·05	0·0								
300	8° 40′ 52″	D	99·45	199·4	298·8							
		O	10·08	10·08	0·0							
400	11° 34′ 30″	D	98·81	198·6	298·5	397·3						
		O	15·09	20·14	15·09	0·0						
500	14° 28′ 7″	D	97·92	197·4	297·3	396·8	494·7					
		O	20·06	30·14	30·14	20·06	0·0					
600	17° 21′ 44″	D	96·79	195·6	295·4	395·3	494·1	590·9				
		O	24·97	40·06	45·11	40·06	24·97	0·0				
700	20° 15′ 22″	D	95·40	193·3	292·8	392·7	492·2	590·1	685·5			
		O	29·82	49·88	59·96	59·96	49·88	29·82	0·0			
800	23° 8′ 59″	D	93·78	190·6	289·4	389·2	489	587·8	684·6	778·4		
		O	34·61	59·58	74·67	79·72	74·67	59·58	34·61	0·0		
900	26° 2′ 37″	D	91·91	187·3	285·2	384·7	484·6	584·1	682	777·4	869·3	
		O	39·30	69·12	89·18	99·26	99·26	89·18	69·12	39·30	0·0	
1000	28° 56′ 14″	D	89·81	183·6	280·4	379·2	479	578·8	677·7	774·5	868·2	958
		O	43·89	78·50	103·5	118·6	123·6	118·6	103·5	78·50	43·89	0·0
1100	31° 49′ 51″		1044·3 length of chord.									
1200	34° 43′ 29″		1127·9 ditto.									
1300	37° 37′ 6″											
1400	40° 30′ 44″											
1500	43° 24′ 21″											
1600	46° 17′ 58″											
1700	49° 11′ 36″											
1800	52° 5′ 13″											
1900	54° 58′ 51″											
2000	57° 52′ 28″											
50	1° 26′ 48·7″		49·99 length of chord.									
10	0° 17′ 21·7″		10·00 ditto.									
1	0° 1′ 44·17″		1·00 ditto.									
To intermediate points.			25	50	75							
		O	0·95	1·26	0·95							
Method No. 4...			1st.	2nd.								
		D	99·83	99·45								
		O	5·05	10·08								

TABLE LXVI. RADIUS 1320. (CHORDS.)

(1320 Feet = 20 Imperial Chains.)

LENGTH OF ARC.	TANGENTIAL ANGLE.		LENGTHS ROUND ARCS, WITH RIGHT-ANGLED OFFSETS (O) THERETO FROM DISTANCES (D) ON CHORDS.											
			100	200	300	400	500	600	700	800	900	1000	1100	1200
100	2° 10′ 13″	D	99·98											
		O	0·0											
200	4° 20′ 26″	D	99·90	199·8										
		O	3·79	0·0										
300	6° 30′ 39″	D	99·69	199·7	299·4									
		O	7·57	7·57	0·0									
400	8° 40′ 52″	D	99·33	199·2	299·1	398·4								
		O	11·34	15·13	11·34	0·0								
500	10° 51′ 5″	D	98·83	198·5	298·5	395·2	497							
		O	15·09	22·66	22·66	15·09	0·0							
600	13° 1′ 18″	D	98·19	197·5	297·4	397·3	496·6	594·8						
		O	18·82	30·16	33·95	30·16	18·82	0·0						
700	15° 11′ 31″	D	97·40	196·2	295·9	395·9	495·6	594·4	691·8					
		O	22·53	37·62	45·19	45·19	37·62	22·53	0·0					
800	17° 21′ 44″	D	96·48	194·7	294	393·9	493·8	593·1	691·3	787·8				
		O	26·20	45·02	56·36	60·15	56·36	45·02	26·20	0·0				
900	19° 31′ 57″	D	95·42	192·8	291·6	391·3	491·3	591	689·8	787·2	882·7			
		O	29·83	52·36	67·45	75·02	75·02	67·45	52·36	29·83	0·0			
1000	21° 42′ 10″	D	94·22	190·7	288·9	388·2	488·1	588	687·4	785·5	882	976·3		
		O	33·43	59·63	78·45	89·79	93·58	89·79	78·45	59·63	33·43	0·0		
1100	23° 52′ 23″	D	92·89	188·3	285·7	384·5	484·2	584·2	683·9	782·7	880·1	975·5	1068·4	
		O	36·97	66·80	89·33	104·4	112·0	112·0	104·4	89·33	66·80	36·97	0·0	
1200	26° 2′ 37″	D	91·42	185·6	282·1	380·3	479·6	579·5	679·4	778·8	877	973·4	1067·7	1159·1
		O	40·46	73·89	100·1	118·9	130·2	134·0	130·2	118·9	100·1	73·89	40·46	0·0
1300	28° 12′ 50″													
1400	30° 23′ 3″													
1500	32° 33′ 16″													
1600	34° 43′ 29″													
1700	36° 53′ 42″													
1800	39° 3′ 55″													
1900	41° 14′ 8″													
2000	43° 24′ 21″													
50	1° 5′ 6·5″		50·00 length of chord.											
10	0° 13′ 1·3″		10·00 ditto.											
1	0° 1′ 18·13″		1·00 ditto.											
To intermediate points.			25	50	75									
		O	0·71	0·95	0·71									
Method No. 4....			1st.	2nd.										
		D	99·90	99·69										
		O	3·79	7·57										

TABLE LXVII. RADIUS 1650. (CHORDS.)

(1650 Feet = 25 Imperial Chains.)

LENGTH OF ARC.	TANGENTIAL ANGLE.		LENGTHS ROUND ARCS, WITH RIGHT-ANGLED OFFSETS (O) THERETO FROM DISTANCES (D) ON CHORDS.											
			100	200	300	400	500	600	700	800	900	1000	1100	1200
100	1° 44′ 10″	D	99·98											
		O	0·0											
200	3° 28′ 21″	D	99·94	199·9										
		O	3·03	0·0										
300	5° 12′ 31″	D	99·80	199·8	299·6									
		O	6·06	6·06	0·0									
400	6° 56′ 42″	D	99·57	199·5	299·4	399								
		O	9·08	12·11	9·08	0·0								
500	8° 40′ 52″	D	99·25	199	299	398·8	498·1							
		O	12·09	18·15	18·15	12·09	0·0							
600	10° 25′ 3″	D	98·84	198·4	298·3	398·3	497·9	596·7						
		O	15·09	24·17	27·20	24·17	15·09	0·0						
700	12° 9′ 13″	D	98·34	197·6	297·4	397·4	497·2	596·4	694·8					
		O	18·08	30·17	36·23	36·23	30·17	18·08	0·0					
800	13° 53′ 23″	D	97·74	196·6	296·2	396·1	496	595·6	694·4	792·2				
		O	21·05	36·14	45·22	48·25	45·22	36·14	21·05	0·0				
900	15° 37′ 34″	D	97·06	195·4	294·7	394·5	494·4	594·2	693·5	791·8	888·9			
		O	24·00	42·08	54·17	60·23	60·23	54·17	42·08	24·00	0·0			
1000	17° 21′ 44″	D	96·29	194	292·9	392·4	492·4	592·3	691·9	790·7	888·5	984·8		
		O	26·93	47·98	63·07	72·15	75·18	72·15	63·07	47·98	26·93	0·0		
1100	19° 5′ 55″	D	95·43	192·5	290·8	390·1	489·9	589·9	689·7	788·9	887·2	984·3	1079·7	
		O	29·83	53·83	71·91	84·00	90·06	90·06	84·00	71·91	53·83	29·83	0·0	
1200	20° 50′ 5″	D	94·48	190·8	288·5	387·4	486·9	586·9	686·8	786·4	885·2	983	1079·2	1173·7
		O	32·71	59·64	80·69	95·78	104·9	107·9	104·9	95·78	80·69	59·64	32·71	0·0
1300	22° 34′ 16″													
1400	24° 18′ 26″													
1500	26° 2′ 36″													
1600	27° 46′ 47″													
1700	29° 30′ 57″													
1800	31° 15′ 8″													
1900	32° 59′ 18″													
2000	34° 43′ 29″													
50	0° 52′ 5·2″		50·00 length of chord.											
10	0° 10′ 25·0″		10·00 ditto.											
1	0° 1′ 2·50″		1·00 ditto.											
To intermediate points.		O	25 0·57	50 0·76	75 0·57									
Method No. 4....		D	1st. 99·94	2nd. 99·80										
		O	3·03	6·06										

TABLE LXVIII. RADIUS 1980. (CHORDS.)

(1980 Feet = 30 Imperial Chains.)

LENGTH OF ARC.	TANGENTIAL ANGLE.		LENGTHS ROUND ARCS, WITH RIGHT-ANGLED OFFSETS (O) THERETO FROM DISTANCES (D) ON CHORDS.											
			100	200	300	400	500	600	700	800	900	1000	1100	1200
100	1° 26′ 45″	D	99·99											
		O	0·0											
200	2° 53′ 37″	D	99·96	199·9										
		O	2·52	0·0										
300	4° 20′ 26″	D	99·86	199·8	299·7									
		O	5·05	5·05	0·0									
400	5° 47′ 15″	D	99·70	199·7	299·6	399·3								
		O	7·57	10·09	7·57	0·0								
500	7° 14′ 4″	D	99·48	199·3	299·3	399·2	498·7							
		O	10·08	15·13	15·13	10·08	0·0							
600	8° 40′ 52″	D	99·19	198·9	298·8	398·8	498·5	597·7						
		O	12·59	20·16	22·68	20·16	12·59	0·0						
700	10° 7′ 41″	D	98·84	198·3	298·2	398·2	498	597·5	696·3					
		O	15·09	25·17	30·22	30·22	25·17	15·09	0·0					
800	11° 34′ 30″	D	98·43	197·6	297·3	397·3	497·2	596·9	696·1	794·6				
		O	17·58	30·17	37·74	40·26	37·74	30·17	17·58	0·0				
900	13° 1′ 18″	D	97·96	196·8	296·3	396·1	496·1	596	695·5	794·3	892·3			
		O	20·06	35·15	45·23	50·28	50·28	45·23	35·15	20·06	0·0			
1000	14° 28′ 7″	D	97·42	195·8	295	394·7	494·7	594·7	694·4	793·5	892	989·4		
		O	22·53	40·11	52·70	60·27	62·79	60·27	52·70	40·11	22·53	0·0		
1100	15° 54′ 56″	D	96·82	194·8	293·6	393·1	493	593	692·8	792·3	891·1	989·1	1086	
		O	24·98	45·04	60·13	70·21	75·26	75·26	70·21	60·13	45·04	24·98	0·0	
1200	17° 21′ 44″	D	96·15	193·6	292	391·2	490·9	590·8	690·8	790·5	889·7	988·1	1085·6	1181·8
		O	27·42	49·95	67·53	80·12	87·69	90·21	87·69	80·12	67·53	49·95	27·42	0·0
1300	18° 48′ 33″													
1400	20° 15′ 22″													
1500	21° 42′ 11″													
1600	23° 8′ 59″													
1700	24° 35′ 48″													
1800	26° 2′ 37″													
1900	27° 29′ 25″													
2000	28° 56′ 14″													
50	0° 43′ 24·4″		50·00 length of chord.											
10	0° 8′ 40·9″		10·00 ditto.											
1	0° 0′ 52·09″		1·00 ditto.											
To intermediate points.		O	25	50	75									
			0·47	0·63	0·47									
Method No. 4....			1st.	2nd.										
		D	99·96	99·86										
		O	2·52	5·05										

TABLE LXIX. RADIUS 2310. (CHORDS.)

(2310 Feet = 35 Imperial Chains.)

LENGTH OF ARC.	TANGENTIAL ANGLE.		LENGTHS ROUND ARCS, WITH RIGHT-ANGLED OFFSETS (O) THERETO FROM DISTANCES (D) ON CHORDS.											
			100	200	300	400	500	600	700	800	900	1000	1100	1200
100	1° 14′ 25″	D	99·99											
		O	0·0											
200	2° 28′ 49″	D	99·97	199·9										
		O	2·16	0·0										
300	3° 43′ 14″	D	99·90	199·9	299·8									
		O	4·33	4·33	0·0									
400	4° 57′ 38″	D	99·78	199·7	299·7	399·5								
		O	6·49	8·65	6·49	0·0								
500	6° 12′ 3″	D	99·62	199·5	299·5	399·4	499							
		O	8·65	12·98	12·98	8·65	0·0							
600	7° 26′ 28″	D	99·41	199·2	299·2	399·1	498·9	598·3						
		O	10·80	17·29	19·45	17·29	10·80	0·0						
700	8° 40′ 52″	D	99·15	198·8	298·7	398·7	498·6	598·2	697·3					
		O	12·95	21·60	25·93	25·93	21·60	12·95	0·0					
800	9° 55′ 17″	D	98·85	198·3	298	398	498	597·8	697·2	796				
		O	15·09	25·89	32·38	34·54	32·38	25·89	15·09	0·0				
900	11° 9′ 41″	D	98·50	197·6	297·3	397·2	497·2	597·1	696·7	795·8	894·3			
		O	17·23	30·18	38·83	43·16	43·16	38·83	30·18	17·23	0·0			
1000	12° 24′ 6″	D	98·10	197	296·4	396·1	496·1	596·1	695·9	795·3	894·1	992·2		
		O	19·36	34·45	45·25	51·74	53·90	51·74	45·25	34·45	19·36	0·0		
1100	13° 38′ 31″	D	97·66	196·2	295·3	394·9	494·8	594·8	694·7	794·4	893·5	992	1089·6	
		O	21·47	38·70	51·65	60·30	64·63	64·63	60·30	51·65	38·70	21·47	0·0	
1200	14° 52′ 55″	D	97·17	195·3	294·1	393·5	493·3	593·3	693·3	793	892·4	991·3	1089·4	1186·5
		O	23·58	42·94	58·03	68·83	75·32	77·48	75·32	68·83	58·03	42·94	23·58	0·0
1300	16° 7′ 20″													
1400	17° 21′ 44″													
1500	18° 36′ 9″													
1600	19° 50′ 34″													
1700	21° 4′ 58″													
1800	22° 19′ 23″													
1900	23° 33′ 47″													
2000	24° 48′ 12″													
50	0° 37′ 12·3″		50·00 length of chord.											
10	0° 7′ 26·5″		10·00 ditto.											
1	0° 0′ 44·65″		1·00 ditto.											
To intermediate points.		O	25 0·40	50 0·54	75 0·40									
Method No. 4...			1st.	2nd.										
		D	99·97	99·90										
		O	2·16	4·33										

TABLE LXX. RADIUS 2640. (CHORDS.)

(2640 Feet = 40 Imperial Chains.)

LENGTH OF ARC.	TANGENTIAL ANGLE.		LENGTHS ROUND ARCS, WITH RIGHT-ANGLED OFFSETS (O) THERETO FROM DISTANCES (D) ON CHORDS.											
			100	200	300	400	500	600	700	800	900	1000	1100	1200
100	1° 5′ 7″	D	99·99											
		O	0·0											
200	2° 10′ 13″	D	99·97	199·9										
		O	1·89	0·0										
300	3° 15′ 20″	D	99·92	199·9	299·8									
		O	3·79	3·79	0·0									
400	4° 20′ 26″	D	99·83	199·8	299·8	399·6								
		O	5·68	7·57	5·68	0·0								
500	5° 25′ 33″	D	99·71	199·6	299·6	399·5	499·2							
		O	7·57	11·36	11·36	7·57	0·0							
600	6° 30′ 39″	D	99·55	199·4	299·3	399·3	499·1	598·7						
		O	9·46	15·14	17·03	15·14	9·46	0·0						
700	7° 35′ 46″	D	99·35	199·1	299	399	498·9	598·6	697·9					
		O	11·34	18·91	22·70	22·70	18·91	11·34	0·0					
800	8° 40′ 52″	D	99·12	198·7	298·5	398·5	498·4	598·3	697·8	796·9				
		O	13·21	22·67	28·35	30·24	28·35	22·67	13·21	0·0				
900	9° 45′ 59″	D	98·85	198·2	297·9	397·8	497·8	597·7	697·4	796·8	895·7			
		O	15·09	26·43	34·00	37·79	37·79	34·00	26·43	15·09	0·0			
1000	10° 51′ 6″	D	98·55	197·7	297·2	397	497	597	696·8	796·4	895·5	994		
		O	16·96	30·17	39·63	45·31	47·20	45·31	39·63	30·17	16·96	0·0		
1100	11° 56′ 12″	D	98·20	197	296·4	396·1	496	596	695·9	795·6	895	993·8	1092	
		O	18·82	33·91	45·25	52·82	56·61	56·61	52·82	45·25	33·91	18·82	0·0	
1200	13° 1′ 18″	D	97·83	196·4	295·5	395	494·9	594·8	694·8	794·6	894·2	993·3	1091·9	1189·7
		O	20·68	37·64	50·85	60·31	65·99	67·88	65·99	60·31	50·85	37·64	20·68	0·0
1300	14° 6′ 25″													
1400	15° 11′ 31″													
1500	16° 16′ 38″													
1600	17° 21′ 44″													
1700	18° 26′ 51″													
1800	19° 31′ 57″													
1900	20° 37′ 4″													
2000	21° 42′ 10″													
50	0° 32′ 33·3″		50·00 length of chord.											
10	0° 6′ 30·7″		10·00 ditto.											
1	0° 0′ 39·07″		1·00 ditto.											
To intermediate points.			25	50	75									
		O	0·35	0·47	0·35									
Method No. 4....			1st.	2nd.										
		D	99·97	99·92										
		O	1·89	3·79										

TABLE LXXI. RADIUS 2970. (CHORDS.)

(2970 Feet = 45 Imperial Chains.)

LENGTH OF ARC.	TANGENTIAL ANGLE.		LENGTHS ROUND ARCS, WITH RIGHT-ANGLED OFFSETS (O) THERETO FROM DISTANCES (D) ON CHORDS.											
			100	200	300	400	500	600	700	800	900	1000	1100	1200
100	0° 57′ 53″	D	100											
		O	0·0											
200	1° 55′ 45″	D	99·98	200										
		O	1·68	0·0										
300	2° 53′ 37″	D	99·94	199·9	299·9									
		O	3·37	3·37	0·0									
400	3° 51′ 30″	D	99·87	199·9	299·8	399·7								
		O	5·05	6·73	5·05	0·0								
500	4° 49′ 22″	D	99·77	199·7	299·7	399·6	499·4							
		O	6·73	10·10	10·10	6·73	0·0							
600	5° 47′ 15″	D	99·64	199·5	299·5	399·5	499·3	599						
		O	8·41	13·46	15·14	13·46	8·41	0·0						
700	6° 45′ 7″	D	99·49	199·3	299·2	399·2	499·1	598·9	698·4					
		O	10·08	16·81	20·18	20·18	16·81	10·08	0·0					
800	7° 43′ 0″	D	99·30	198·9	298·8	398·8	498·8	598·6	698·3	797·6				
		O	11·76	20·17	25·22	26·90	25·22	20·17	11·76	0·0				
900	8° 40′ 52″	D	99·09	198·6	298·4	398·3	498·3	598·2	698	797·5	896·6			
		O	13·43	23·51	30·24	33·61	33·61	30·24	23·51	13·43	0·0			
1000	9° 38′ 45″	D	98·85	198·2	297·8	397·7	497·6	597·6	697·5	797·1	896·4	995·3		
		O	15·09	26·85	35·26	40·31	41·99	40·31	35·26	26·85	15·09	0·0		
1100	10° 36′ 37″	D	98·58	197·7	297·2	396·9	496·9	596·9	696·8	796·6	896·1	995·2	1093·7	
		O	16·75	30·18	40·26	46·99	50·36	50·36	46·99	40·26	30·18	16·75	0·0	
1200	11° 34′ 30″	D	98·29	197·1	296·4	396·1	496	595·9	695·9	795·8	895·4	994·7	1093·6	1191·9
		O	18·41	33·50	45·26	53·67	58·72	60·40	58·72	53·67	45·26	33·50	18·41	0·0
1300	12° 32′ 22″													
1400	13° 30′ 15″													
1500	14° 28′ 7″													
1600	15° 25′ 59″													
1700	16° 23′ 52″													
1800	17° 21′ 44″													
1900	18° 19′ 37″													
2000	19° 17′ 29″													
50	0° 28′ 56·3″		50·00	length of chord.										
10	0° 5′ 47·3″		10·00	ditto.										
1	0° 0′ 34·73″		1·00	ditto.										
To intermediate points.			25	50	75									
		O	0·32	0·42	0·32									
Method No. 4...			1st.	2nd.										
		D	99·98	99·94										
		O	1·68	3·37										

TABLE LXXII. RADIUS 3300. (CHORDS.)

(3300 Feet = 50 Imperial Chains.)

LENGTH OF ARC.	TANGENTIAL ANGLE.		LENGTHS ROUND ARCS, WITH RIGHT-ANGLED OFFSETS (O) THERETO FROM DISTANCES (D) ON CHORDS.											
			100	200	300	400	500	600	700	800	900	1000	1100	1200
100	0° 52′ 5″	D	100											
		O	0·0											
200	1° 44′ 10″	D	99·98	200										
		O	1·51	0·0										
300	2° 36′ 16″	D	99·95	199·9	299·9									
		O	3·03	3·03	0·0									
400	3° 28′ 21″	D	99·89	199·9	299·8	399·7								
		O	4·54	6·05	4·54	0·0								
500	4° 20′ 26″	D	99·81	199·8	299·8	399·7	499·5							
		O	6·06	9·09	9·09	6·06	0·0							
600	5° 12′ 31″	D	99·71	199·6	299·6	399·6	499·5	599·2						
		O	7·57	12·11	13·62	12·11	7·57	0·0						
700	6° 4′ 36″	D	99·58	199·4	299·3	399·3	499·3	599·1	698·7					
		O	9·08	15·14	18·17	18·17	15·14	9·08	0·0					
800	6° 56′ 42″	D	99·44	199·2	299	399	499	598·9	698·6	798				
		O	10·59	18·16	22·70	24·21	22·70	18·16	10·59	0·0				
900	7° 48′ 47″	D	99·26	198·8	298·6	398·6	498·6	598·5	698·4	797·9	897·2			
		O	12·08	21·16	27·22	30·25	30·25	27·22	21·16	12·08	0·0			
1000	8° 40′ 52″	D	99·07	198·5	298·2	398·1	498·1	598·1	698	797·7	897·1	996·2		
		O	13·59	24·18	31·75	36·29	37·80	36·29	31·75	24·18	13·59	0·0		
1100	9° 32′ 57″	D	98·85	198·1	297·7	397·5	497·4	597·4	697·4	797·2	896·8	996	1094·9	
		O	15·09	27·17	36·25	42·31	45·34	45·34	42·31	36·25	27·17	15·09	0·0	
1200	10° 25′ 3″	D	98·61	197·7	297·1	396·8	496·7	596·7	696·7	796·6	896·3	995·7	1094·8	1193·4
		O	16·59	30·18	40·77	48·34	52·88	54·39	52·88	48·34	40·77	30·18	16·59	0·0
1300	11° 17′ 8″													
1400	12° 9′ 13″													
1500	13° 1′ 18″													
1600	13° 53′ 23″													
1700	14° 45′ 29″													
1800	15° 37′ 34″													
1900	16° 29′ 39″													
2000	17° 21′ 44″													
50	0° 26′ 2·6″		50·00 length of chord.											
10	0° 5′ 12·5″		10·00 ditto.											
1	0° 0′ 31·25″		1·00 ditto.											
To intermediate points.		O	25 0·28	50 0·38	75 0·28									
Method No. 4....		D	1st. 99·98	2nd. 99·95										
		O	1·51	3·03										

TABLE LXXIII. RADIUS 3630. (CHORDS.)

(3630 Feet = 55 Imperial Chains.)

LENGTH OF ARC.	TANGENTIAL ANGLE.		LENGTHS ROUND ARCS, WITH RIGHT-ANGLED OFFSETS (O) THERETO FROM DISTANCES (D) ON CHORDS.											
			100	200	300	400	500	600	700	800	900	1000	1100	1200
100	0° 47′ 21″	D	100											
		O	0·0											
200	1° 34′ 42″	D	99·99	200										
		O	1·38	0·0										
300	2° 22′ 3″	D	99·96	200	299·9									
		O	2·75	2·75	0·0									
400	3° 9′ 24″	D	99·91	199·9	299·9	399·8								
		O	4·13	5·51	4·13	0·0								
500	3° 56′ 46″	D	99·84	199·8	299·8	399·8	499·6							
		O	5·51	8·26	8·26	5·51	0·0							
600	4° 44′ 7″	D	99·76	199·7	299·7	399·7	499·6	599·3						
		O	6·88	11·01	12·39	11·01	6·88	0·0						
700	5° 31′ 28″	D	99·65	199·5	299·4	399·4	499·4	599·2	698·9					
		O	8·25	13·76	16·51	16·51	13·76	8·25	0·0					
800	6° 18′ 49″	D	99·53	199·3	299·2	399·2	499·2	599·1	698·8	798·4				
		O	9·63	16·51	20·64	22·02	20·64	16·51	9·63	0·0				
900	7° 6′ 10″	D	99·39	199	298·9	398·8	498·8	598·8	698·6	798·3	897·7			
		O	11·00	19·25	24·76	27·51	27·51	24·76	19·25	11·00	0·0			
1000	7° 53′ 31″	D	99·23	198·8	298·5	398·4	498·4	598·4	698·3	798·1	897·6	996·9		
		O	12·36	21·99	28·87	33·00	34·38	33·00	28·87	21·99	12·36	0·0		
1100	8° 40′ 52″	D	99·05	198·4	298·1	397·9	497·9	597·9	697·8	797·7	897·3	996·7	1095·8	
		O	13·73	24·73	32·98	38·49	41·24	41·24	38·49	32·98	24·73	13·73	0·0	
1200	9° 28′ 13″	D	98·85	198·1	297·6	397·4	497·3	597·3	697·3	797·2	896·9	996·5	1095·7	1194·5
		O	15·09	27·45	37·08	43·96	48·09	49·47	48·09	43·96	37·08	27·45	15·09	0·0
1300	10° 15′ 34″													
1400	11° 2′ 56″													
1500	11° 50′ 17″													
1600	12° 37′ 38″													
1700	13° 24′ 59″													
1800	14° 12′ 20″													
1900	14° 59′ 41″													
2000	15° 47′ 2″													
50	0° 23′ 40·6″		50·00 length of chord.											
10	0° 4′ 44·1″		10·00 ditto.											
1	0° 0′ 28·41″		1·00 ditto.											
To intermediate points.		O	25 0·26	50 0·35	75 0·26									
Method No. 4....		D	1st. 99·99	2nd. 99·96										
		O	1·38	2·75										

TABLE LXXIV. RADIUS 3960. (CHORDS.)

(3960 Feet = 60 Imperial Chains.)

LENGTH OF ARC.	TANGENTIAL ANGLE.		LENGTHS ROUND ARCS, WITH RIGHT-ANGLED OFFSETS (O) THERETO FROM DISTANCES (D) ON CHORDS.											
			100	200	300	400	500	600	700	800	900	1000	1100	1200
100	0° 43′ 24″	D	100											
		O	0·0											
200	1° 26′ 49″	D	99·99	200										
		O	1·26	0·0										
300	2° 10′ 13″	D	99·96	200	299·9									
		O	2·52	2·52	0·0									
400	2° 53′ 37″	D	99·92	199·9	299·9	399·8								
		O	3·78	5·04	3·78	0·0								
500	3° 37′ 2″	D	99·87	199·8	299·8	399·8	499·7							
		O	5·05	7·57	7·57	5·05	0·0							
600	4° 20′ 26″	D	99·80	199·7	299·7	399·7	499·6	599·4						
		O	6·32	10·10	11·36	10·10	6·32	0·0						
700	5° 3′ 51″	D	99·71	199·6	299·5	399·5	499·5	599·4	699·1					
		O	7·57	12·62	15·14	15·14	12·62	7·57	0·0					
800	5° 47′ 15″	D	99·60	199·4	299·3	399·3	499·3	599·2	699	798·6				
		O	8·83	15·15	18·93	20·19	18·93	15·15	8·83	0·0				
900	6° 30′ 39″	D	99·48	199·2	299·1	399	499	599	698·8	798·6	898			
		O	10·08	17·65	22·70	25·22	25·22	22·70	17·65	10·08	0·0			
1000	7° 14′ 4″	D	99·35	199	298·8	398·7	498·7	598·6	698·6	798·4	898	997·3		
		O	11·34	20·17	26·49	30·27	31·53	30·27	26·49	20·17	11·34	0·0		
1100	7° 57′ 28″	D	99·20	198·7	298·4	398·3	498·2	598·2	698·2	798	897·8	997·2	1096·4	
		O	12·59	22·67	30·24	35·29	37·81	37·81	35·29	30·24	22·67	12·59	0·0	
1200	8° 40′ 52″	D	99·03	198·4	298	397·8	497·7	597·7	697·7	797·6	897·4	997	1096·3	1195·4
		O	13·84	25·18	34·01	40·33	44·11	45·37	44·11	40·33	34·01	25·18	13·84	0·0
1300	9° 24′ 17″													
1400	10° 7′ 41″													
1500	10° 51′ 5″													
1600	11° 34′ 30″													
1700	12° 17′ 54″													
1800	13° 1′ 18″													
1900	13° 44′ 43″													
2000	14° 28′ 7″													
50	0° 21′ 42·2″		50·00 length of chord.											
10	0° 4′ 20·4″		10·00 ditto.											
1	0° 0′ 26·04″		1·00 ditto.											
To intermediate points.		O	25 0·24	50 0·31	75 0·24									
Method No. 4...			1st.	2nd.										
		D	99·99	99·96										
		O	1·26	2·52										

TABLE LXXV. RADIUS 4290. (CHORDS.)

(4290 Feet 65 Imperial Chains.)

LENGTH OF ARC.	TANGENTIAL ANGLE.	LENGTHS ROUND ARCS, WITH RIGHT-ANGLED OFFSETS (O) THERETO FROM DISTANCES (D) ON CHORDS.											
			100	200	300	400	500	600	700	800	900	1000	1100	1200
100	0° 40′ 4″	D	100											
		O	0·0											
200	1° 20′ 8″	D	99·99	200										
		O	1·16	0·0										
300	2° 0′ 12″	D	99·97	200	299·9									
		O	2·33	2·33	0·0									
400	2° 40′ 16″	D	99·93	199·9	299·9	399·8								
		O	3·49	4·65	3·49	0·0								
500	3° 20′ 20″	D	99·89	199·9	299·9	399·8	499·7							
		O	4·66	6·99	6·99	4·66	0·0							
600	4° 0′ 24″	D	99·83	199·8	299·8	399·7	499·7	599·5						
		O	5·82	9·31	10·47	9·31	5·82	0·0						
700	4° 40′ 28″	D	99·75	199·6	299·6	399·6	499·6	599·5	699·2					
		O	6·99	11·65	13·98	13·98	11·65	6·99	0·0					
800	5° 20′ 32″	D	99·66	199·5	299·4	399·4	499·4	599·3	699·2	798·8				
		O	8·15	13·97	17·46	18·62	17·46	13·97	8·15	0·0				
900	6° 0′ 36″	D	99·56	199·3	299·2	399·2	499·2	599·1	699	798·8	898·3			
		O	9·31	16·30	20·96	23·29	23·29	20·96	16·30	9·31	0·0			
1000	6° 40′ 40″	D	99·45	199·1	298·9	398·9	498·9	598·9	698·8	798·6	898·3	997·7		
		O	10·47	18·62	24·44	27·93	29·09	27·93	24·44	18·62	10·47	0·0		
1100	7° 20′ 44″	D	99·32	198·9	298·6	398·5	498·5	598·5	698·5	798·3	898·1	997·7	1097	
		O	11·63	20·94	27·93	32·59	34·92	34·92	32·59	27·93	20·94	11·63	0·0	
1200	8° 0′ 48″	D	99·18	198·6	298·3	398·1	498	598	698	798	897·8	997·5	1096·9	1196·1
		O	12·78	23·25	31·40	37·22	40·71	41·87	40·71	37·22	31·40	23·25	12·78	0·0
1300	8° 40′ 52″													
1400	9° 20′ 56″													
1500	10° 1′ 0″													
1600	10° 41′ 4″													
1700	11° 21′ 8″													
1800	12° 1′ 12″													
1900	12° 41′ 16″													
2000	13° 21′ 20″													
50	0° 20′ 2″		50·00 length of chord.											
10	0° 4′ 0·4″		10·00 ditto.											
1	0° 0′ 24·04″		1·00 ditto.											
To intermediate points.		O	25 0·22	50 0·29	75 0·22									
Method No. 4....			1st.	2nd.										
		D	99·99	99·97										
		O	1·16	2·33										

TABLE LXXVI. RADIUS 4620. (CHORDS.)

(4620 Feet = 70 Imperial Chains.)

LENGTH OF ARC.	TANGENTIAL ANGLE.		LENGTHS ROUND ARCS, WITH RIGHT-ANGLED OFFSETS (O) THERETO FROM DISTANCES (D) ON CHORDS.											
			100	200	300	400	500	600	700	800	900	1000	1100	1200
100	0° 37′ 12″	D	100											
		O	0·0											
200	1° 14′ 25″	D	99·99	200										
		O	1·08	0·0										
300	1° 51′ 37″	D	99·97	200	300									
		O	2·16	2·16	0·0									
400	2° 28′ 49″	D	99·94	199·9	299·9	399·9								
		O	3·25	4·33	3·25	0·0								
500	3° 6′ 2″	D	99·90	199·9	299·9	399·8	499·8							
		O	4·32	6·48	6·48	4·32	0·0							
600	3° 43′ 14″	D	99·85	199·8	299·8	399·8	499·7	599·6						
		O	5·41	8·66	9·74	8·66	5·41	0·0						
700	4° 20′ 26″	D	99·78	199·7	299·7	399·7	499·6	599·5	699·3					
		O	6·49	10·81	12·97	12·97	10·81	6·49	0·0					
800	4° 57′ 38″	D	99·71	199·6	299·5	399·5	499·5	599·4	699·3	799				
		O	7·57	12·98	16·23	17·31	16·23	12·98	7·57	0·0				
900	5° 34′ 51″	D	99·62	199·4	299·3	399·3	499·3	599·2	699·1	798·9	898·6			
		O	8·65	15·14	19·46	21·62	21·62	19·46	15·14	8·65	0·0			
1000	6° 12′ 3″	D	99·52	199·2	299·1	399	499	599	698·9	798·8	898·5	998		
		O	9·72	17·29	22·70	25·95	27·03	25·95	22·70	17·29	9·72	0·0		
1100	6° 49′ 15″	D	99·41	199	298·8	398·7	498·7	598·7	698·7	798·6	898·3	998	1097·4	
		O	10·80	19·45	25·94	30·26	32·42	32·42	30·26	25·94	19·45	10·80	0·0	
1200	7° 26′ 28″	D	99·29	198·8	298·5	398·4	498·3	598·3	698·3	798·2	898·1	997·8	1097·3	1196·6
		O	11·88	21·60	29·17	34·58	37·83	38·91	37·83	34·58	29·17	21·60	11·88	0·0
1300	8° 3′ 40″													
1400	8° 40′ 52″													
1500	9° 18′ 5″													
1600	9° 55′ 17″													
1700	10° 32′ 29″													
1800	11° 9′ 41″													
1900	11° 46′ 54″													
2000	12° 24′ 6″													
50	0° 18′ 36·2″		50·00 length of chord.											
10	0° 3′ 43·2″		10·00 ditto.											
1	0° 0′ 22·32″		1·00 ditto.											
To intermediate points.		O	25 0·20	50 0·27	75 0·20									
Method No. 4....			1st.	2nd.										
		D	99·99	99·97										
		O	1·08	2·16										

TABLE LXXVII. RADIUS 4950. (CHORDS.)

(4950 Feet = 75 Imperial Chains.)

LENGTH OF ARC.	TANGENTIAL ANGLE.		LENGTHS ROUND ARCS, WITH RIGHT-ANGLED OFFSETS (O) THERETO FROM DISTANCES (D) ON CHORDS.											
			100	200	300	400	500	600	700	800	900	1000	1100	1200
100	0° 34′ 44″	D	100											
		O	0·0											
200	1° 9′ 27″	D	99·99	200										
		O	1·01	0·0										
300	1° 44′ 11″	D	99·98	200	300									
		O	2·02	2·02	0·0									
400	2° 18′ 54″	D	99·95	199·9	299·9	399·9								
		O	3·03	4·04	3·03	0·0								
500	2° 53′ 37″	D	99·92	199·9	299·9	399·9	499·8							
		O	4·04	6·06	6·06	4·04	0·0							
600	3° 28′ 21″	D	99·87	199·8	299·8	399·8	499·8	599·6						
		O	5·05	8·08	9·09	8·08	5·05	0·0						
700	4° 3′ 4″	D	99·81	199·7	299·7	399·7	499·7	599·6	699·4					
		O	6·06	10·10	12·12	12·12	10·10	6·06	0·0					
800	4° 37′ 48″	D	99·75	199·6	299·6	399·6	499·6	599·5	699·4	799·1				
		O	7·07	12·12	15·15	16·16	15·15	12·12	7·07	0·0				
900	5° 12′ 31″	D	99·67	199·5	299·4	399·4	499·4	599·4	699·3	799·1	898·8			
		O	8·07	14·13	18·17	20·19	20·19	18·17	14·13	8·07	0·0			
1000	5° 47′ 15″	D	99·58	199·3	299·2	399·1	499·1	599·1	699·1	799	898·7	998·3		
		O	9·08	16·15	21·20	24·23	25·24	24·23	21·20	16·15	9·08	0·0		
1100	6° 21′ 58″	D	99·49	199·2	299	398·9	498·9	598·9	698·9	798·8	898·6	998·2	1097·7	
		O	10·08	18·15	24·21	28·25	30·27	30·27	28·25	24·21	18·15	10·08	0·0	
1200	6° 56′ 42″	D	99·38	199	298·7	398·6	498·5	598·5	698·5	798·5	898·3	998·1	1097·7	1197
		O	11·09	20·17	27·24	32·29	35·32	36·33	35·32	32·29	27·24	20·17	11·09	0·0
1300	7° 31′ 25″													
1400	8° 6′ 9″													
1500	8° 40′ 52″													
1600	9° 15′ 36″													
1700	9° 50′ 19″													
1800	10° 25′ 3″													
1900	10° 59′ 46″													
2000	11° 34′ 30″													
50	0° 17′ 21·8″		50·00 length of chord.											
10	0° 3′ 28·4″		10·00 ditto.											
1	0° 0′ 20·84″		1·00 ditto.											
To intermediate points.		O	25 0·19	50 0·25	75 0·19									
Method No. 4....			1st.	2nd.										
		D	99·99	99·98										
		O	1·01	2·02										

TABLE LXXVIII. RADIUS 5280. (CHORDS.)

(5280 Feet = 80 Imperial Chains.)

LENGTH OF ARC.	TANGENTIAL ANGLE.		LENGTHS ROUND ARCS, WITH RIGHT-ANGLED OFFSETS (O) THERETO FROM DISTANCES (D) ON CHORDS.											
			100	200	300	400	500	600	700	800	900	1000	1100	1200
100	0° 32′ 33″	D	100											
		O	0·0											
200	1° 5′ 7″	D	99·99	200										
		O	0·25	0·0										
300	1° 37′ 40″	D	99·98	200	300									
		O	1·89	1·89	0·0									
400	2° 10′ 13″	D	99·96	200	299·9	399·9								
		O	2·84	3·79	2·84	0·0								
500	2° 42′ 46″	D	99·92	199·9	299·9	399·9	499·8							
		O	3·79	5·68	5·68	3·79	0·0							
600	3° 15′ 20″	D	99·88	199·8	299·8	399·8	499·8	599·7						
		O	4·74	7·58	8·53	7·58	4·74	0·0						
700	3° 47′ 53″	D	99·83	199·8	299·7	399·7	499·7	599·6	699·5					
		O	5·68	9·47	11·36	11·36	9·47	5·68	0·0					
800	4° 20′ 26″	D	99·78	199·7	299·6	399·6	499·6	599·6	699·4	799·2				
		O	6·63	11·37	14·21	15·16	14·21	11·37	6·63	0·0				
900	4° 52′ 59″	D	99·71	199·5	299·5	399·4	499·4	599·4	699·3	799·2	898·9			
		O	7·57	13·25	17·04	18·93	18·93	17·04	13·25	7·57	0·0			
1000	5° 25′ 33″	D	99·63	199·4	299·3	399·2	499·2	599·2	699·2	799·1	898·8	998·5		
		O	8·51	15·14	19·88	22·72	23·67	22·72	19·88	15·14	8·51	0·0		
1100	5° 58′ 6″	D	99·55	199·3	299·1	399	499	599	699	798·9	898·7	998·4	1098	
		O	9·46	17·03	22·71	26·50	28·39	28·39	26·50	22·71	17·03	9·46	0·0	
1200	6° 30′ 39″	D	99·45	199·1	298·9	398·7	498·7	598·7	698·7	798·6	898·5	998·3	1097·9	1197·4
		O	10·40	18·91	25·54	30·28	33·12	34·07	33·12	30·28	25·54	18·91	10·40	0·0
1300	7° 3′ 12″													
1400	7° 35′ 46″													
1500	8° 8′ 19″													
1600	8° 40′ 52″													
1700	9° 13′ 25″													
1800	9° 45′ 59″													
1900	10° 18′ 32″													
2000	10° 51′ 5″													
50	0° 16′ 16·6″		50·00 length of chord.											
10	0° 3′ 15·3″		10·00 ditto.											
1	0° 0′ 19·53″		1·00 ditto.											
To intermediate points.		O	25 0·18	50 0·24	75 0·18									
Method No. 4....			1st.	2nd.										
		D	99·99	99·98										
		O	0·95	1·89										

TABLE LXXIX. RADIUS 6600. (CHORDS.)

(6600 Feet = 100 Imperial Chains.)

LENGTH OF ARC.	TANGENTIAL ANGLE.		LENGTHS ROUND ARCS, WITH RIGHT-ANGLED OFFSETS (O) THERETO FROM DISTANCES (D) ON CHORDS.											
			100	200	300	400	500	600	700	800	900	1000	1100	1200
100	0° 26′ 3″	D	100											
		O	0·0											
200	0° 52′ 5″	D	100	200										
		O	0·76	0·0										
300	1° 18′ 8″	D	99·99	200	300									
		O	1·51	1·51	0·0									
400	1° 44′ 10″	D	99·97	200	300	399·9								
		O	2·27	3·03	2·27	0·0								
500	2° 10′ 13″	D	99·95	199·9	299·9	399·9	499·9							
		O	3·03	4·54	4·54	3·03	0·0							
600	2° 36′ 16″	D	99·93	199·9	299·9	399·9	499·9	599·8						
		O	3·79	6·06	6·82	6·06	3·79	0·0						
700	3° 2′ 18″	D	99·90	199·9	299·8	399·8	499·8	599·8	699·7					
		O	4·54	7·57	9·08	9·08	7·57	4·54	0·0					
800	3° 28′ 21″	D	99·86	199·8	299·8	399·8	499·8	599·7	699·7	799·5				
		O	5·30	9·09	11·36	12·12	11·36	9·09	5·30	0·0				
900	3° 54′ 23″	D	99·81	199·7	299·7	399·7	499·7	599·6	699·6	799·5	899·3			
		O	6·06	10·60	13·63	15·14	15·14	13·63	10·60	6·06	0·0			
1000	4° 20′ 26″	D	99·77	199·6	299·6	399·5	499·5	599·5	699·5	799·4	899·3	999·1		
		O	6·82	12·12	15·91	18·18	18·94	18·18	15·91	12·12	6·82	0·0		
1100	4° 46′ 29″	D	99·71	199·5	299·4	399·4	499·4	599·4	699·4	799·3	899·2	999	1098·7	
		O	7·57	13·63	18·17	21·20	22·71	22·71	21·20	18·17	13·63	7·57	0·0	
1200	5° 12′ 31″	D	99·65	199·4	299·3	399·2	499·2	599·2	699·2	799·2	899·1	998·9	1098·7	1198·3
		O	8·33	15·15	20·45	24·24	26·51	27·27	26·51	24·24	20·45	15·15	8·33	0·0
1300	5° 38′ 34″													
1400	6° 4′ 36″													
1500	6° 30′ 39″													
1600	6° 56′ 42″													
1700	7° 22′ 44″													
1800	7° 48′ 47″													
1900	8° 14′ 50″													
2000	8° 40′ 52″													
50	0° 13′ 1·3″		50·00	length of chord.										
10	0° 2′ 36·3″		10·00	ditto.										
1	0° 0′ 15·63″		1·00	ditto.										
To intermediate points.		O	25 0·14	50 0·19	75 0·14									
Method No. 4...		D	1st. 100	2nd. 99·99										
		O	0·76	1·51										

TABLE LXXX. RADIUS 7920. (CHORDS.)

(7920 Feet = 120 Imperial Chains.)

LENGTH OF ARC.	TANGENTIAL ANGLE.		LENGTHS ROUND ARCS, WITH RIGHT-ANGLED OFFSETS (O) THERETO FROM DISTANCES (D) ON CHORDS.											
			100	200	300	400	500	600	700	800	900	1000	1100	1200
100	0° 21′ 42″	D	100											
		O	0·0											
200	0° 43′ 24″	D	100	200										
		O	0·63	0·0										
300	1° 5′ 7″	D	99·99	200	300									
		O	1·26	1·26	0·0									
400	1° 26′ 49″	D	99·98	200	300	400								
		O	1·89	2·52	1·89	0·0								
500	1° 48′ 31″	D	99·97	200	300	400	499·9							
		O	2·52	3·78	3·78	2·52	0·0							
600	2° 10′ 13″	D	99·95	199·9	299·9	399·9	499·9	599·8						
		O	3·15	5·04	5·67	5·04	3·15	0·0						
700	2° 31′ 55″	D	99·93	199·9	299·9	399·9	499·9	599·8	699·8					
		O	3·78	6·30	7·56	7·56	6·30	3·78	0·0					
800	2° 53′ 37″	D	99·90	199·8	299·8	399·8	499·8	599·8	699·8	799·7				
		O	4·41	7·56	9·45	10·08	9·45	7·56	4·41	0·0				
900	3° 15′ 20″	D	99·87	199·8	299·8	399·8	499·8	599·8	699·7	799·6	899·5			
		O	5·05	8·83	11·35	12·61	12·61	11·35	8·83	5·05	0·0			
1000	3° 37′ 2″	D	99·84	199·7	299·7	399·7	499·7	599·7	699·7	799·6	899·5	999·3		
		O	5·68	10·09	13·24	15·13	15·76	15·13	13·24	10·09	5·68	0·0		
1100	3° 58′ 44″	D	99·80	199·7	299·6	399·6	499·6	599·6	699·6	799·5	899·4	999·3	1099·1	
		O	6·31	11·36	15·14	17·66	18·92	18·92	17·66	15·14	11·36	6·31	0·0	
1200	4° 20′ 26″	D	99·76	199·6	299·5	399·4	499·4	599·4	699·4	799·4	899·4	999·3	1099·1	1198·8
		O	6·94	12·62	17·03	20·18	22·07	22·70	22·07	20·18	17·03	12·62	6·94	0·0
1300	4° 42′ 8″													
1400	5° 3′ 51″													
1500	5° 25′ 33″													
1600	5° 47′ 15″													
1700	6° 8′ 57″													
1800	6° 30′ 39″													
1900	6° 52′ 21″													
2000	7° 14′ 4″													
50	0° 10′ 51·1″		50·00 length of chord.											
10	0° 2′ 10·2″		10·00 ditto.											
1	0° 0′ 13·02″		1·00 ditto.											
To intermediate points.		O	25 0·12	50 0·16	75 0·12									
Method No. 4....		D	1st. 100	2nd. 99·99										
		O	0·63	1·26										

TABLE LXXXI. RADIUS 10,560. (CHORDS.)

(10,560 Feet = 160 Imperial Chains.)

LENGTH OF ARC.	TANGENTIAL ANGLE.		LENGTHS ROUND ARCS, WITH RIGHT-ANGLED OFFSETS (O) THERETO FROM DISTANCES (D) ON CHORDS.											
			100	200	300	400	500	600	700	800	900	1000	1100	1200
100	0° 16′ 17″	D	100											
		O	0·0											
200	0° 32′ 33″	D	100	200										
		O	0·48	0·0										
300	0° 48′ 50″	D	100	200	300									
		O	0·95	0·95	0·0									
400	1° 5′ 7″	D	99·99	200	300	400								
		O	1·42	1·90	1·42	0·0								
500	1° 21′ 23″	D	99·98	200	300	400	500							
		O	1·89	2·84	2·84	1·89	0·0							
600	1° 37′ 40″	D	99·97	200	300	400	500	599·9						
		O	2·37	3·79	4·27	3·79	2·37	0·0						
700	1° 53′ 56″	D	99·96	199·9	299·9	399·9	499·9	599·9	699·9					
		O	2·84	4·73	5·68	5·68	4·73	2·84	0·0					
800	2° 10′ 13″	D	99·94	199·9	299·9	399·9	499·9	599·9	699·9	799·8				
		O	3·31	5·68	7·10	7·58	7·10	5·68	3·31	0·0				
900	2° 26′ 30″	D	99·92	199·9	299·9	399·9	499·9	599·9	699·8	799·8	899·7			
		O	3·79	6·63	8·52	9·47	9·47	8·52	6·63	3·79	0·0			
1000	2° 42′ 46″	D	99·90	199·8	299·8	399·8	499·8	599·8	699·8	799·8	899·7	999·6		
		O	4·27	7·58	9·95	11·37	11·85	11·37	9·95	7·58	4·27	0·0		
1100	2° 59′ 3″	D	99·88	199·8	299·8	399·7	499·7	599·7	699·7	799·7	899·7	999·6	1099·5	
		O	4·74	8·53	11·37	13·26	14·21	14·21	13·26	11·37	8·53	4·74	0·0	
1200	3° 15′ 20″	D	99·86	199·8	299·7	399·7	499·7	599·7	699·7	799·7	899·6	999·6	1099·5	1199·3
		O	5·21	9·48	12·79	15·16	16·58	17·06	16·58	15·16	12·79	9·48	5·21	0·0
1300	3° 31′ 36″													
1400	3° 47′ 53″													
1500	4° 4′ 9″													
1600	4° 20′ 26″													
1700	4° 36′ 43″													
1800	4° 52′ 59″													
1900	5° 9′ 16″													
2000	5° 25′ 33″													
50	0° 8′ 8·3″		50·00 length of chord.											
10	0° 1′ 37·7″		10·00 ditto.											
1	0° 0′ 9·77″		1·00 ditto.											
To intermediate points.		O	25 0·09	50 0·12	75 0·09									
Method No. 4....			1st.	2nd.										
		D	100	100										
		O	0·48	0·95										

TABLES.

DIVISION II.—(TANGENTS.)

For setting out, by Method No. 3, curves with useful radii varying

from 1,000 to 16,000 (which, when the unit of measurement is an imperial link, is for ranging in imperial links curves with radii from ten imperial chains to two miles) . . . . . Tables LXXXII. to XCIX. inclusive; and

from 330 to 10,560 (which, when the unit of measurement is a foot, is for ranging in feet curves with radii from 330 to 10,560 feet, that is, from five imperial chains to two miles) . . . . . Tables C. to CXXII. inclusive.

BLE LXXXII. RADIUS 1000. (TANGENTS.)

ANGLE AT TERSECTION TANGENTS.		LENGTHS ROUND ARCS, WITH OFFSETS (O) THERETO FROM DISTANCES (D) ON TANGENTS.													
		LENGTHS BACK ARC FROM CENTRE-POINT OF ARC.						INTER-SECTION OF TAN-GENTS.	LENGTHS FORWARD ARC FROM CENTRE-POINT OF ARC.						
		500	400	300	200	100	0		0	100	200	300	400	500	600
° 27′ 33″	D					0	99·83	100·3	0·50	100·3					
	O					0·00	4·99	**5·02**	4·99	0·00					
° 55′ 6″	D				0	99·83	198·7	202·7	4·04	102·9	202·7				
	O				0·00	4·99	19·94	**20·35**	19·94	4·99	0·00				
22′ 38″	D			0	99·83	198·7	295·6	309·3	13·82	110·7	209·5	309·3			
	O			0·00	4·99	19·94	44·67	**46·75**	44·67	19·94	4·99	0·00			
50′ 11″	D		0	99·83	198·7	295·6	389·4	422·8	33·37	127·3	224·1	322·9	422·8		
	O		0·00	4·99	19·94	44·67	78·93	**85·70**	78·93	44·67	19·94	4·99	0·00		
17′ 44″	D	0	99·83	198·7	295·6	389·4	479·5	546·3	66·87	156·9	250·8	347·6	446·4	546·3	
	O	0·00	4·99	19·94	44·67	78·93	122·4	**139·5**	122·4	78·93	44·67	19·94	4·99	0·00	

LXXXIII. RADIUS 1500. (TANGENTS.)

POLE AT INTERSECTION TANGENTS.		LENGTHS ROUND ARCS, WITH OFFSETS (O) THERETO FROM DISTANCES (D) ON TANGENTS.													
		LENGTHS BACK ARC FROM CENTRE-POINT OF ARC.						INTERSECTION OF TANGENTS.	LENGTHS FORWARD ARC FROM CENTRE-POINT OF ARC.						
		500	400	300	200	100	0		0	100	200	300	400	500	600
22″	D					0	99·94	100·2	0·22	100·2					
	O					0·00	3·33	**3·34**	3·33	0·00					
16′ 44″	D				0	99·94	199·4	201·2	1·78	101·3	201·2				
	O				0·00	3·33	13·31	**13·43**	13·31	3·33	0·00				
55′ 6″	D			0	99·94	199·4	298	304·1	6·06	104·7	204·1	304·1			
	O			0·00	3·33	13·31	29·90	**30·50**	29·90	13·31	3·33	0·00			
28″	D		0	99·94	199·4	298	395·3	409·8	14·48	111·7	210·3	309·8	409·		
	O		0·00	3·33	13·31	29·90	53·02	**54·96**	53·02	29·90	13·31	3·33	0·0 8		
11′ 50″	D	0	99·94	199·4	298	395·3	490·8	519·4	28·59	124·1	221·4	320	419·5	519·4	
	O	0·00	3·33	13·31	29·90	53·02	82·57	**87·37**	82·57	53·02	29·90	13·31	3·33	0·00	

TABLE LXXXIV. RADIUS 2000. (TANGENTS.)

ANGLE AT INTERSECTION OF TANGENTS.		LENGTHS ROUND ARCS, WITH OFFSETS (O) THERETO FROM DISTANCES (D) ON TANGENTS.													
		LENGTHS BACK ARC FROM CENTRE-POINT OF ARC.						INTERSECTION OF TANGENTS.	LENGTHS FORWARD ARC FROM CENTRE-POINT OF ARC.						
		500	400	300	200	100	0		0	100	200	300	400	500	600
5° 43′ 46″	D					0	99·96	100·1	0·13	100·1					
	O					0·00	2·50	**2·51**	2·50	0·00					
11° 27′ 33″	D				0	99·96	199·6	200·7	1·00	100·7	200·7				
	O				0·00	2·50	9·99	**10·04**	9·99	2·50	0·00				
17° 11′ 19″	D			0	99·96	199·6	298·9	302·3	3·40	102·6	202·3	302·3			
	O			0·00	2·50	9·99	22·47	**22·72**	22·47	9·99	2·50	0·00			
55′ 6″	D		0	99·96	199·6	298·9	397·3	405·4	8·08	106·5	205·7	305·4	405·4		
	O		0·00	2·50	9·99	22·47	39·87	**40·67**	39·87	22·47	9·99	2·50	0·00		
38′ 52″	D	0	99·96	199·6	298·9	397·3	494·8	510·7	15·88	113·3	211·8	311	410·7	510·7	
	O	0·00	2·50	9·99	22·47	39·87	62·18	**64·17**	62·18	39·87	22·47	9·99	2·50	0·00	
84° 22′ 38″	D	99·96	199·6	298·9	397·3	494·8	591	618·7	27·63	123·8	221·3	319·8	419	518·7	618·7
	O	2·50	9·99	22·47	39·87	62·18	89·33	**93·51**	89·33	62·18	39·87	22·47	9·99	2·50	0·00

TABLE LXXXV. RADIUS 2500. (TANGENTS.)

LENGTHS ROUND ARCS, WITH OFFSETS (O) THERETO FROM DISTANCES (D) ON TANGENTS.

AT TION NTS.		LENGTHS BACK ARC FROM CENTRE-POINT OF ARC.						INTER-SECTION OF TAN-GENTS.	LENGTHS FORWARD ARC FROM CENTRE-POINT OF ARC.						
		500	400	300	200	100	0		0	100	200	300	400	500	600
	1″	D					0	99·97	100·1	0·08	100·1					
		O					0·00	2·00	2·00	2·00	0·00					
10′	2″	D				0	99·97	199·8	200·4	0·64	100·4	200·4				
		O				0·00	2·00	8·00	8·03	8·00	2·00	0·00				
45′	3″	D			0	99·97	199·8	299·3	301·4	2·17	101·7	201·5	301·4			
		O			0·00	2·00	8·00	17·98	18·11	17·98	8·00	2·00	0·00			
	5″	D		0	99·97	199·8	299·3	398·3	403·4	5·15	104·2	203·7	303·5	403·4		
		O		0·00	2·00	8·00	17·98	31·93	32·34	31·93	17·98	8·00	2·00	0·00		
55′	6″	D	0	99·97	199·8	299·3	398·3	496·7	506·8	10·10	108·5	207·5	307	406·8	506·8	
		O	0·00	2·00	8·00	17·98	31·93	49·83	50·84	49·83	31·93	17·98	8·00	2·00	0·00	
	7″	D	99·97	199·8	299·3	398·3	496·7	594·3	611·8	17·53	115·1	213·5	312·5	412	511·8	611·8
		O	2·00	8·00	17·98	31·93	49·83	71·65	73·76	71·65	49·83	31·93	17·98	8·00	2·00	0·00

TABLE LXXXVI. RADIUS 3000. (TANGENTS.)

ANGLE AT INTERSECTION OF TANGENTS.		LENGTHS ROUND ARCS, WITH OFFSETS (O) THERETO FROM DISTANCES (D) ON TANGENTS.													
		LENGTHS BACK ARC FROM CENTRE-POINT OF ARC.						INTER-SECTION OF TAN-GENTS.	LENGTHS FORWARD ARC FROM CENTRE-POINT OF ARC.						
		500	400	300	200	100	0		0	100	200	300	400	500	600
3° 49′ 11″	D					0	99·98	100	0·05	100					
	O					0·00	1·67	1·67	1·67	0·00					
7° 38′ 22″	D				0	99·98	199·8	200·3	0·45	100·3	200·3				
	O				0·00	1·67	6·66	6·68	6·66	1·67	0·00				
11° 27′ 33″	D			0	99·98	199·8	299·5	301	1·50	101·1	201	301·			
	O			0·00	1·67	6·66	14·98	15·06	14·98	6·66	1·67	0·00			
15° 16′ 44″	D		0	99·98	199·8	299·5	398·8	402·4	3·57	102·9	202·5	302·4	402·4		
	O		0·00	1·67	6·66	14·98	26·62	26·86	26·62	14·98	6·66	1·67	0·00		
5′ 55″	D	0	99·98	199·8	299·5	398·8	497·7	504·7	6·99	105·9	205·2	304·8	404·7	504·7	
	O	0·00	1·67	6·66	14·98	26·62	41·56	42·15	41·56	26·62	14·98	6·66	1·67	0·00	
55′ 6″	D	99·98	199·8	299·5	398·8	497·7	596	608·1	12·12	110·4	209·3	308·6	408·3	508·1	608·1
	O	1·67	6·66	14·98	26·62	41·56	59·80	61·02	59·80	41·56	26·62	14·98	6·66	1·67	0·00

TABLE LXXXVII. RADIUS 3500. (TANGENTS.)

ANGLE AT INTERSECTION OF TANGENTS.		LENGTHS ROUND ARCS, WITH OFFSETS (O) THERETO FROM DISTANCES (D) ON TANGENTS.												
		LENGTHS BACK ARC FROM CENTRE-POINT OF ARC.						INTERSECTION OF TANGENTS.	LENGTHS FORWARD ARC FROM CENTRE-POINT OF ARC.					
		500	400	300	200	100	0		0	100	200	300	400	500	600
3° 16′ 26″	D					0	99·98	100	0·04	100					
	O					0·00	1·43	**1·43**	1·43	0·00					
6° 32′ 53″	D				0	99·98	199·9	200·2	0·33	100·2	200·2				
	O				0·00	1·43	5·71	**5·72**	5·71	1·43	0·00				
9° 49′ 20″	D			0	99·98	199·9	299·6	300·7	1·10	100·8	200·7	300·7			
	O			0·00	1·43	5·71	12·85	**12·90**	12·85	5·71	1·43	0·00			
13° 5′ 46″	D		0	99·98	199·9	299·6	399·1	401·7	2·62	102·1	201·9	301·8	401·7		
	O		0·00	1·43	5·71	12·85	22·83	**22·98**	22·83	12·85	5·71	1·43	0·00		
16° 22′ 13″	D	0	99·98	199·9	299·6	399·1	498·3	503·4	5·13	104·3	203·8	303·5	403·4	503·4	
	O	0·00	1·43	5·71	12·85	22·83	35·65	**36·02**	35·65	22·83	12·85	5·71	1·43	0·00	
19° 38′ 39″	D	99·98	199·9	299·6	399·1	498·3	597·1	606	8·88	107·6	206·8	306·3	406·1	506	606
	O	1·43	5·71	12·85	22·83	35·65	51·30	**52·06**	51·30	35·65	22·83	12·85	5·71	1·43	0·00

TABLE LXXXVIII. RADIUS 4000. (TANGENTS.)

ANGLE AT INTERSECTION OF TANGENTS.		LENGTHS ROUND ARCS, WITH OFFSETS (O) THERETO FROM DISTANCES (D) ON TANGENTS.													
		LENGTHS BACK ARC FROM CENTRE-POINT OF ARC.						INTERSECTION OF TANGENTS.	LENGTHS FORWARD ARC FROM CENTRE-POINT OF ARC.						
		500	400	300	200	100	0		0	100	200	300	400	500	600
2° 51′ 53″	D					0	99·99	100	0·03	100					
	O					0·00	1·25	**1·25**	1·25	0·00					
5° 43′ 46″	D				0	99·99	199·9	200·2	0·25	100·2	200·2				
	O				0·00	1·25	5·00	**5·01**	5·00	1·25	0·00				
8° 35′ 40″	D			0	99·99	199·9	299·7	300·6	0·84	100·6	200·6	300·6			
	O			0·00	1·25	5·00	11·24	**11·27**	11·24	5·00	1·25	0·00			
11° 27′ 33″	D		0	99·99	199·9	299·7	399·3	401·3	2·00	101·6	201·4	301·3	401·3		
	O		0·00	1·25	5·00	11·24	19·98	**20·08**	19·98	11·24	5·00	1·25	0·00		
14° 19′ 26″	D	0	99·99	199·9	299·7	399·3	498·7	502·6	3·92	103·3	202·9	302·7	402·6	502·6	
	O	0·00	1·25	5·00	11·24	19·98	31·21	**31·45**	31·21	19·98	11·24	5·00	1·25	0·00	
17° 11′ 19″	D	99·99	199·9	299·7	399·3	498·7	597·8	604·5	6·79	105·8	205·2	304·8	404·8	504·5	604·5
	O	1·25	5·00	11·24	19·98	31·21	44·92	**45·42**	44·92	31·21	19·98	11·24	5·00	1·25	0·00

TABLE LXXXIX. RADIUS **4500.** (TANGENTS.)

ANGLE AT INTERSECTION OF TANGENTS.		LENGTHS ROUND ARCS, WITH OFFSETS (O) THERETO FROM DISTANCES (D) ON TANGENTS.													
		LENGTHS BACK ARC FROM CENTRE-POINT OF ARC.						INTER-SECTION OF TAN-GENTS.	LENGTHS FORWARD ARC FROM CENTRE-POINT OF ARC.						
		500	400	300	200	100	0		0	100	200	300	400	500	600
2° 32′ 47″	D					0	99·99	100	0·03	100					
	O					0·00	1·11	**1·11**	1·11	0·00					
5° 5′ 35″	D				0	99·99	199·9	200·1	0·20	100·1	200·1				
	O				0·00	1·11	4·44	**4·44**	4·44	1·11	0·00				
7° 38′ 22″	D			0	99·99	199·9	299·8	300·5	0·66	100·5	200·5	300·5			
	O			0·00	1·11	4·44	9·99	**10·01**	9·99	4·44	1·11	0·00			
10° 11′ 9″	D		0	99·99	199·9	299·8	399·5	401	1·58	101·3	201·1	301	401		
	O		0·00	1·11	4·44	9·99	17·76	**17·83**	17·76	9·99	4·44	1·11	0·00		
12° 43′ 57″	D	0	99·99	199·9	299·8	399·5	499	502·1	3·10	102·6	202·3	302·1	402·1	502·1	
	O	0·00	1·11	4·44	9·99	17·76	27·74	**27·91**	27·74	17·76	9·99	4·44	1·11	0·00	
5° 16′ 44″	D	99·99	199·9	299·8	399·5	499	598·2	603·6	5·36	104·6	204·1	303·8	403·6	503·6	603·6
	O	1·11	4·44	9·99	17·76	27·74	39·93	**40·29**	39·93	27·74	17·76	9·99	4·44	1·11	0·00

TABLE XC. RADIUS **5000.** (TANGENTS.)

LENGTH OF ARC.	ANGLE AT INTERSECTION OF TANGENTS.		LENGTHS ROUND ARCS, WITH OFFSETS (O) THERETO FROM DISTANCES (D) ON TANGENTS.													
			LENGTHS BACK ARC FROM CENTRE-POINT OF ARC.						INTERSECTION OF TANGENTS.	LENGTHS FORWARD ARC FROM CENTRE-POINT OF ARC.						
			500	400	300	200	100	0		0	100	200	300	400	500	600
)0	2° 17′ 31″	D					0	99·99	100	0·02	100					
		O					0·00	1·00	**1·00**	1·00	0·00					
)0	4° 35′ 1″	D				0	99·99	199·9	200·1	0·15	100·1	200·1				
		O				0·00	1·00	4·00	**4·00**	4·00	1·00	0·00				
)0	6° 52′ 32″	D			0	99·99	199·9	299·8	300·4	0·54	100·4	200·4	300·4			
		O			0·00	1·00	4·00	9·00	**9·02**	9·00	4·00	1·00	0·00			
)0	9° 10′ 2″	D		0	99·99	199·9	299·8	399·6	400·9	1·28	101	200·9	300·9	400·9		
		O		0·00	1·00	4·00	9·00	15·99	**16·04**	15·99	9·00	4·00	1·00	0·00		
	11° 27′ 33″	D	0	99·99	199·9	299·8	399·6	499·1	501·7	2·51	102·1	201·9	301·7	401·7	501·7	
		O	0·00	1·00	4·00	9·00	15·99	24·98	**25·11**	24·98	15·99	9·00	4·00	1·00	0·00	
)00	13° 45′ 3″	D	99·99	199·9	299·8	399·6	499·1	598·5	602·9	4·34	103·7	203·3	303·1	402·9	502·9	602·9
		O	1·00	4·00	9·00	15·99	24·98	35·96	**36·22**	35·96	24·98	15·99	9·00	4·00	1·00	0.00

TABLE XCI. RADIUS 5500. (TANGENTS.)

ANGLE AT INTERSECTION OF TANGENTS.		LENGTHS ROUND ARCS, WITH OFFSETS (O) THERETO FROM DISTANCES (D) ON TANGENTS.													
		LENGTHS BACK ARC FROM CENTRE-POINT OF ARC.						INTER-SECTION OF TAN-GENTS.	LENGTHS FORWARD ARC FROM CENTRE-POINT OF ARC.						
		500	400	300	200	100	0		0	100	200	300	400	500	600
2° 5′ 0″	D					0	99·99	100	0·02	100					
	O					0·00	0·91	**0·91**	0·91	0·00					
4° 10′ 1″	D				0	99·99	200	200·1	0·13	100·1	200·1				
	O				0·00	0·91	3·64	**3·64**	3·64	0·91	0·00				
6° 15′ 2″	D			0	99·99	200	299·8	300·3	0·45	100·3	200·3	300·3			
	O			0·00	0·91	3·64	8·19	**8·20**	8·19	3·64	0·91	0·00			
8° 20′ 2″	D		0	99·99	200	299·8	399·6	400·7	1·06	100·9	200·8	300·7	400·7		
	O		0·00	0·91	3·64	8·19	14·55	**14·59**	14·55	8·19	3·64	0·91	0·00		
10° 25′ 3″	D	0	99·99	200	299·8	399·6	499·3	501·4	2·07	101·7	201·5	301·4	401·4	501·4	
	O	0·00	0·91	3·64	8·19	14·55	22·72	**22·81**	22·72	14·55	8·19	3·64	0·91	0·00	
12° 30′ 3″	D	99·99	200	299·8	399·6	499·3	598·8	602·4	3·58	103·1	202·7	302·5	402·4	502·4	602·4
	O	0·91	3·64	8·19	14·55	22·72	32·70	**32·90**	32·70	22·72	14·55	8·19	3·64	0·91	0·00

TABLE XCII. RADIUS 6000. (TANGENTS.)

LENGTH OF ARC.	ANGLE AT INTERSECTION OF TANGENTS.		LENGTHS ROUND ARCS, WITH OFFSETS (O) THERETO FROM DISTANCES (D) ON TANGENTS.													
			LENGTHS BACK ARC FROM CENTRE-POINT OF ARC.						INTERSECTION OF TANGENTS.	LENGTHS FORWARD ARC FROM CENTRE-POINT OF ARC.						
			500	400	300	200	100	0		0	100	200	300	400	500	600
)0	1° 54′ 36″	D					0	100	100	0·01	100					
		O					0·00	0·83	**0·83**	0·83	0·00					
	3° 49′ 11″	D				0	100	200	200·1	0·11	100·1	200·1				
		O				0·00	0·83	3·33	**3·33**	3·33	0·83	0·00				
)0	5° 43′ 46″	D			0	100	200	299·9	300·2	0·38	100·3	200·2	300·2			
		O			0·00	0·83	3·33	7·50	**7·51**	7·50	3·33	0·83	0·00			
0	7° 38′ 22″	D		0	100	200	299·9	399·7	400·6	0·89	100·7	200·6	300·6	400·6		
		O		0·00	0·83	3·33	7·50	13·33	**13·36**	13·33	7·50	3·33	0·83	0·00		
)0	9° 32′ 57″	D	0	100	200	299·9	399·7	499·4	501·2	1·74	101·5	201·3	301·2	401·2	501·2	
		O	0·00	0·83	3·33	7·50	13·33	20·81	**20·88**	20·81	13·33	7·50	3·33	0·83	0·00	
00	11° 27′ 33″	D	100	200	299·9	399·7	499·4	599	602	3·01	102·6	202·3	302·1	402	502	602
		O	0·83	3·33	7·50	13·33	20·81	29·96	**30·11**	29·96	20·81	13·33	7·50	3·33	0·83	0·00

TABLE XCIII. RADIUS **6500**. (TANGENTS.)

LENGTH OF ARC.	ANGLE AT INTERSECTION OF TANGENTS.		LENGTHS ROUND ARCS, WITH OFFSETS (O) THERETO FROM DISTANCES (D) ON TANGENTS.													
			LENGTHS BACK ARC FROM CENTRE-POINT OF ARC.						INTERSECTION OF TANGENTS.	LENGTHS FORWARD ARC FROM CENTRE-POINT OF ARC.						
			500	400	300	200	100	0		0	100	200	300	400	500	600
	1° 45′ 47″	D					0	100	100	0·01	100					
		O					0·00	0·77	**0·77**	0·77	0·00					
	3° 31′ 33″	D				0	100	200	200·1	0·09	100·1	200·1				
		O				0·00	0·77	3·08	**3·08**	3·08	0·77	0·00				
	5° 17′ 20″	D			0	100	200	299·9	300·2	0·33	100·3	200·2	300·2			
		O			0·00	0·77	3·08	6·93	**6·94**	6·93	3·08	0·77	0·00			
300	7° 3′ 6″	D		0	100	200	299·9	399·8	400·5	0·75	100·6	200·5	300·5	400·5		
		O		0·00	0·77	3·08	6·93	12·31	**12·33**	12·31	6·93	3·08	0·77	0·00		
	8° 48′ 53″	D	0	100	200	299·9	399·8	499·5	501	1·48	101·2	201·1	301	401	501	
		O	0·00	0·77	3·08	6·93	12·31	19·23	**19·29**	19·23	12·31	6·93	3·08	0·77	0·0 0	
200	10° 34′ 40″	D	100	200	299·9	399·8	499·5	599·2	601·7	2·56	102·2	202	301·8	401·7	501·7	601·7
		O	0·77	3·08	6·93	12·31	19·23	27·68	**27·80**	27·68	19·23	12·31	6·93	3·08	0·77	0·00

TABLE XCIV. RADIUS 7000. (TANGENTS.)

LENGTH OF ARC.	ANGLE AT INTERSECTION OF TANGENTS.		LENGTHS ROUND ARCS, WITH OFFSETS (O) THERETO FROM DISTANCES (D) ON TANGENTS.													
			LENGTHS BACK ARC FROM CENTRE-POINT OF ARC.						INTERSECTION OF TANGENTS.	LENGTHS FORWARD ARC FROM CENTRE-POINT OF ARC.						
			500	400	300	200	100	0		0	100	200	300	400	500	600
00	1° 38′ 13″	D					0	100	100	0·01	100					
		O					0·00	0·71	**0·71**	0·71	0·00					
00	3° 16′ 26″	D				0	100	200	200·1	0·08	100·1	200·1				
		O				0·00	0·71	2·85	**2·85**	2·85	0·71	0·00				
00	4° 54′ 40″	D			0	100	200	299·9	300·2	0·28	100·2	200·2	300·2			
		O			0·00	0·71	2·85	6·42	**6·43**	6·42	2·85	0·71	0·00			
0	6° 32′ 53″	D		0	100	200	299·9	399·8	400·4	0·65	100·5	200·5	300·4	400·4		
		O		0·00	0·71	2·85	6·42	11·42	**11·44**	11·42	6·42	2·85	0·71	0·00		
00	8° 11′ 6″	D	0	100	200	299·9	399·8	499·6	500·8	1·28	101·1	200·9	300·9	400·8	500·8	
		O	0·00	0·71	2·85	6·42	11·42	17·85	**17·90**	17·85	11·42	6·42	2·85	0·71	0·00	
00	9° 49′ 20″	D	100	200	299·9	399·8	499·6	599·3	601·5	2·21	101·9	201·7	301·6	401·5	501·5	601·5
		O	0·71	2·85	6·42	11·42	17·85	25·69	**25·78**	25·69	17·85	11·42	6·42	2·85	0·71	0·00

TABLE XCV. RADIUS **7500.** (TANGENTS.)

LENGTH OF ARC.	ANGLE AT INTERSECTION OF TANGENTS.		LENGTHS ROUND ARCS, WITH OFFSETS (O) THERETO FROM DISTANCES (D) ON TANGENTS.													
			LENGTHS BACK ARC FROM CENTRE-POINT OF ARC.						INTER-SECTION OF TAN-GENTS.	LENGTHS FORWARD ARC FROM CENTRE-POINT OF ARC.						
			500	400	300	200	100	0		0	100	200	300	400	500	600
200	1° 31′ 40″	D					0	100	100	0·01	100					
		O					0·00	0·67	**0·67**	0·67	0·00					
400	3° 3′ 21″	D				0	100	200	200·1	0·07	100·1	200·1				
		O				0·00	0·67	2·66	**2·66**	2·66	0·67	0·00				
600	4° 35′ 1″	D			0	100	200	299·9	300·2	0·23	100·2	200·2	300·2			
		O			0·00	0·67	2·66	6·00	**6·00**	6·00	2·66	0·67	0·00			
800	6° 6′ 42″	D		0	100	200	299·9	399·8	400·4	0·56	100·5	200·4	300·4	400·4		
		O		0·00	0·67	2·66	6·00	10·66	**10·67**	10·66	6·00	2·66	0·67	0·00		
1000	7° 38′ 22″	D	0	100	200	299·9	399·8	499·6	500·7	1·11	100·9	200·8	300·8	400·7	500·7	
		O	0·00	0·67	2·66	6·00	10·66	16·66	**16·70**	16·66	10·66	6·00	2·66	0·67	0·00	
1200	9° 10′ 2″	D	100	200	299·9	399·8	499·6	599·4	601·3	1·92	101·7	201·5	301·4	401·3	501·3	601·3
		O	0·67	2·66	6·00	10·66	16·66	24·00	**24·08**	24·00	16·66	10·66	6·00	2·66	0·67	0·00

TABLE XCVI. RADIUS **8000.** (TANGENTS.)

LENGTH OF ARC.	ANGLE AT INTERSECTION OF TANGENTS.		LENGTHS ROUND ARCS, WITH OFFSETS (O) THERETO FROM DISTANCES (D) ON TANGENTS.													
			LENGTHS BACK ARC FROM CENTRE-POINT OF ARC.						INTERSECTION OF TANGENTS.	LENGTHS FORWARD ARC FROM CENTRE-POINT OF ARC.						
			500	400	300	200	100	0		0	100	200	300	400	500	600
200	1° 25′ 57″	D					0	100	100	0·01	100					
		O					0·00	0·62	**0·62**	0·62	0·00					
400	2° 51′ 53″	D				0	100	200	200	0·05	100	200				
		O				0·00	0·62	2·50	**2·50**	2·50	0·62	0·00				
600	4° 17′ 50″	D			0	100	200	299·9	300·1	0·20	100·2	200·1	300·1			
		O			0·00	0·62	2·50	5·62	**5·62**	5·62	2·50	0·62	0·00			
800	5° 43′ 46″	D		0	100	200	299·9	399·8	400·3	0·50	100·4	200·4	300·3	400·3		
		O		0·00	0·62	2·50	5·62	10·00	**10·01**	10·00	5·62	2·50	0·62	0·00		
1000	7° 9′ 43″	D	0	100	200	299·9	399·8	499·7	500·7	0·98	100·8	200·8	300·7	400·7	500·7	
		O	0·00	0·62	2·50	5·62	10·00	15·62	**15·65**	15·62	10·00	5·62	2·50	0·62	0·00	
1200	8° 35′ 40″	D	100	200	299·9	399·8	499·7	599·5	601·1	1·69	101·5	201·3	301·2	401·2	501·1	601·1
		O	0·62	2·50	5·62	10·00	15·62	22·50	**22·56**	22·50	15·62	10·00	5·62	2·50	0·62	0·00

TABLE XCVII. RADIUS 10,000. (TANGENTS.)

LENGTH OF ARC.	ANGLE AT INTERSECTION OF TANGENTS.		LENGTHS ROUND ARCS, WITH OFFSETS (O) THERETO FROM DISTANCES (D) ON TANGENTS.													
			LENGTHS BACK ARC FROM CENTRE-POINT OF ARC.						INTER-SECTION OF TAN-GENTS.	LENGTHS FORWARD ARC FROM CENTRE-POINT OF ARC.						
			500	400	300	200	100	0		0	100	200	300	400	500	600
200	1° 8′ 45″	D					0	100	100	0·01	100					
		O					0·00	0·50	**0·50**	0·50	0·00					
400	2° 17′ 31″	D				0	100	200	200	0·04	100	200				
		O				0·00	0·50	2·00	**2·00**	2·00	0·50	0·00				
600	3° 26′ 16″	D			0	100	200	300	300·1	0·13	100·1	200·1	300·1			
		O			0·00	0·50	2·00	4·50	**4·50**	4·50	2·00	0·50	0·00			
800	4° 35′ 1″	D		0	100	200	300	399·9	400·2	0·32	100·3	200·2	300·2	400·2		
		O		0·00	0·50	2·00	4·50	8·00	**8·01**	8·00	4·50	2·00	0·50	0·00		
1000	5° 43′ 46″	D	0	100	200	300	399·9	499·8	500·4	0·64	100·5	200·5	300·4	400·4	500·4	
		O	0·00	0·50	2·00	4·50	8·00	12·50	**12·51**	12·50	8·00	4·50	2·00	0·50	0·00	
1200	6° 52′ 32″	D	100	200	300	399·9	499·8	599·6	600·7	1·08	100·9	200·8	300·8	400·7	500·7	600·7
		O	0·50	2·00	4·50	8·00	12·50	18·00	**18·03**	18·00	12·50	8·00	4·50	2·00	0·50	0·00

TABLE XCVIII. RADIUS 12,000. (TANGENTS.)

LENGTH OF ARC.	ANGLE AT INTERSECTION OF TANGENTS.		LENGTHS ROUND ARCS, WITH OFFSETS (O) THERETO FROM DISTANCES (D) ON TANGENTS.													
			LENGTHS BACK ARC FROM CENTRE-POINT OF ARC.						INTER-SECTION OF TAN-GENTS.	LENGTHS FORWARD ARC FROM CENTRE-POINT OF ARC.						
			500	400	300	200	100	0		0	100	200	300	400	500	600
200	0° 57′ 18″	D					0	100	100	0·00	100					
		O					0·00	0·42	0·42	0·42	0·00					
400	1° 54′ 36″	D				0	100	200	200	0·02	100	200				
		O				0·00	0·42	1·66	1·66	1·66	0·42	0·00				
600	2° 51′ 53″	D			0	100	200	300	300·1	0·09	100·1	200·1	300·1			
		O			0·00	0·42	1·66	3·75	3·75	3·75	1·66	0·42	0·00			
800	3° 49′ 11″	D		0	100	200	300	399·9	400·1	0·22	100·2	200·2	300·1	400·1		
		O		0·00	0·42	1·66	3·75	6·66	6·66	6·66	3·75	1·66	0·42	0·00		
1000	4° 46′ 29″	D	0	100	200	300	399·9	499·9	500·3	0·44	100·4	200·3	300·3	400·3	500·3	
		O	0·00	0·42	1·66	3·75	6·66	10·42	10·43	10·42	6·66	3·75	1·66	0·42	0·00	
1200	5° 43′ 46″	D	100	200	300	399·9	499·9	599·8	600·5	0·75	100·6	200·6	300·5	400·5	500·5	600·5
		O	0·42	1·66	3·75	6·66	10·42	15·00	15·02	15·00	10·42	6·66	3·75	1·66	0·42	0.00

TABLE XCIX. RADIUS 16,000. (TANGENTS.)

LENGTH OF ARC.	ANGLE AT INTERSECTION OF TANGENTS.		LENGTHS ROUND ARCS, WITH OFFSETS (O) THERETO FROM DISTANCES (D) ON TANGENTS.													
			LENGTHS BACK ARC FROM CENTRE-POINT OF ARC.						INTERSECTION OF TANGENTS.	LENGTHS FORWARD ARC FROM CENTRE-POINT OF ARC.						
			500	400	300	200	100	0		0	100	200	300	400	500	600
200	0° 42′ 58″	D					0	100	100	0·00	100					
		O					0·00	0·31	**0·31**	0·31	0·00					
400	1° 25′ 57″	D				0	100	200	200	0·01	100	200				
		O				0·00	0·31	1·25	**1·25**	1·25	0·31	0·00				
600	2° 8′ 55″	D			0	100	200	300	300	0·05	100	200	300			
		O			0·00	0·31	1·25	2·81	**2·81**	2·81	1·25	0·31	0·00			
800	2° 51′ 53″	D		0	100	200	300	400	400·1	0·12	100·1	200·1	300·1	400·1		
		O		0·00	0·31	1·25	2·81	5·00	**5·00**	5·00	2·81	1·25	0·31	0·00		
1000	3° 34′ 52″	D	0	100	200	300	400	499·9	500·2	0·24	100·2	200·2	300·2	400·2	500·2	
		O	0·00	0·31	1·25	2·81	5·00	7·81	**7·82**	7·81	5·00	2·81	1·25	0·31	0·00	
1200	4° 17′ 50″	D	100	200	300	400	499·9	599·8	600·3	0·42	100·3	200·3	300·3	400·3	500·3	600·3
		O	0·31	1·25	2·81	5·00	7·81	11·25	**11·26**	11·25	7·81	5·00	2·81	1·25	0·31	0·00

TABLE C. RADIUS 330. (TANGENTS.)

(330 Feet = 5 Imperial Chains.)

LENGTH OF ARC.	ANGLE AT INTERSECTION OF TANGENTS.		LENGTHS ROUND ARCS, WITH OFFSETS (O) THERETO FROM DISTANCES (D) ON TANGENTS.												
			LENGTHS BACK ARC FROM CENTRE-POINT OF ARC.						INTERSECTION OF TANGENTS.	LENGTHS FORWARD ARC FROM CENTRE-POINT OF ARC.					
			500	400	300	200	100	0		0	100	200	300	400	500	600
200	34° 43′ 29″	D					0	98·48	103·2	4·70	103·2					
		O					0·00	15·04	**15·76**	15·04	0·00					
400	69° 26′ 58″	D				0	98·48	188	228·7	40·74	130·2	228·7				
		O				0·00	15·04	58·78	**71·52**	58·78	15·04	0·00				
	104° 10′ 26″	D			0	98·48	188	260·3	423·7	163·3	235·7	325·2	423·7			
		O			0·00	15·04	58·78	127·2	**207**	127·2	58·78	15·04	0·00			

TABLE CI. RADIUS 396. (TANGENTS.)

(396 Feet = 6 Imperial Chains.)

DEG OF CURVE.	ANGLE AT INTERSECTION OF TANGENTS.		LENGTHS ROUND ARCS, WITH OFFSETS (O) THERETO FROM DISTANCES (D) ON TANGENTS.													
			LENGTHS BACK ARC FROM CENTRE-POINT OF ARC.						INTERSECTION OF TANGENTS.	LENGTHS FORWARD ARC FROM CENTRE-POINT OF ARC.						
			500	400	300	200	100	0		0	100	200	300	400	500	600
200	28° 56′ 14″	D					0	98·94	102·2	3·24	102·2					
		O					0·00	12·56	**12·97**	12·56	0·00					
400	57° 52′ 28″	D				0	98·94	191·6	218·9	27·33	120	218·9				
		O				0·00	12·56	49·44	**56·49**	49·44	12·56	0·00				
600	86° 48′ 42″	D			0	98·94	191·6	272·1	374·5	102·4	182·9	275·6	374·5			
		O			0·00	12·56	49·44	108·3	**149·1**	108·3	49·44	12·56	0·00			

TABLE CII. RADIUS 462. (TANGENTS.)

(462 Feet = 7 Imperial Chains.)

CHORD OF LENGTH	ANGLE AT INTERSECTION OF TANGENTS.		LENGTHS ROUND ARCS, WITH OFFSETS (O) THERETO FROM DISTANCES (D) ON TANGENTS.													
			LENGTHS BACK ARC FROM CENTRE-POINT OF ARC.						INTERSECTION OF TANGENTS.	LENGTHS FORWARD ARC FROM CENTRE-POINT OF ARC.						
			500	400	300	200	100	0		0	100	200	300	400	500	600
200	24° 48′ 12″	D					0	99·22	101·6	2·38	101·6					
		O					0·00	10·80	**11·05**	10·80	0·00					
400	49° 36′ 24″	D				0	99·22	193·8	213·5	19·71	114·3	213·5				
		O				0·00	10·80	42·64	**46·96**	42·64	10·80	0·00				
600	74° 24′ 36″	D			0	99·22	193·8	279·4	350·7	71·40	157	251·5	350·7			
		O			0·00	10·80	42·64	94·05	**118·1**	94·05	42·64	10·80	0·00			

TABLE CIII. RADIUS 528. (TANGENTS.)

(528 Feet = 8 Imperial Chains.)

ANGLE AT INTERSECTION OF TANGENTS.		LENGTHS ROUND ARCS, WITH OFFSETS (O) THERETO FROM DISTANCES (D) ON TANGENTS.												
		LENGTHS BACK ARC FROM CENTRE-POINT OF ARC.						INTERSECTION OF TANGENTS.	LENGTHS FORWARD ARC FROM CENTRE-POINT OF ARC.					
		500	400	300	200	100	0		0	100	200	300	400	500	600
21° 42′ 10″	D					0	99·40	101·2	1·81	101·2					
	O					0·00	9·44	9·61	9·44	0·00					
43° 24′ 21″	D				0	99·40	195·2	210·1	14·90	110·7	210·1				
	O				0·00	9·44	37·43	40·29	37·43	9·44	0·00				
65° 6′ 31″	D			0	99·40	195·2	284·1	337·1	52·96	141·8	237·7	337·1			
	O			0·00	9·44	37·43	82·96	98·42	82·96	37·43	9·44	0·00			

TABLE CIV. RADIUS 594. (TANGENTS.)

(594 Feet = 9 Imperial Chains.)

DEG. OF ELEMENT.	ANGLE AT INTERSECTION OF TANGENTS.		LENGTHS ROUND ARCS, WITH OFFSETS (O) THERETO FROM DISTANCES (D) ON TANGENTS.													
			LENGTHS BACK ARC FROM CENTRE-POINT OF ARC.						INTERSECTION OF TANGENTS.	LENGTHS FORWARD ARC FROM CENTRE-POINT OF ARC.						
			500	400	300	200	100	0		0	100	200	300	400	500	600
	19° 17′ 29″	D					0	99·53	101	1·43	101					
		O					0·00	8·40	8·52	8·40	0·00					
400	38° 34′ 59″	D				0	99·53	196·2	207·9	11·68	108·4	207·9				
		O				0·00	8·40	33·36	35·34	33·36	8·40	0·00				
600	57° 52′ 28″	D			0	99·53	196·2	287·4	328·4	41·01	132·2	228·9	328·4			
		O			0·00	8·40	33·36	74·17	84·74	74·17	33·36	8·40	0·00			

TABLE CV. RADIUS 660. (TANGENTS.)

(660 Feet = 10 Imperial Chains.)

CHORD OF 100 FEET.	ANGLE AT INTERSECTION OF TANGENTS.		LENGTHS ROUND ARCS, WITH OFFSETS (O) THERETO FROM DISTANCES (D) ON TANGENTS.													
			LENGTHS BACK ARC FROM CENTRE-POINT OF ARC.						INTERSECTION OF TANGENTS.	LENGTHS FORWARD ARC FROM CENTRE-POINT OF ARC.						
			500	400	300	200	100	0		0	100	200	300	400	500	600
200	17° 21′ 44″	D					0	99·62	100·8	1·15	100·8					
		O					0·00	7·56	**7·65**	7·56	0·00					
400	34° 43′ 29″	D				0	99·62	197	206·4	9·40	106·8	206·4				
		O				0·00	7·56	30·07	**31·50**	30·07	7·56	0·00				
600	52° 5′ 13″	D			0	99·62	197	289·8	322·5	32·75	125·5	222·9	322·5			
		O			0·00	7·56	30·07	67·01	**74·58**	67·01	30·07	7·56	0·00			
800	69° 26′ 57″	D		0	99·62	197	289·8	376	457·4	81·47	167·7	260·5	357·8	457·4		
		O		0·00	7·56	30·07	67·01	117·6	**143**	117·6	67·01	30·07	7·56	0·00		

TABLE CVI. RADIUS 990. (TANGENTS.)

(990 Feet = 15 Imperial Chains.)

LENGTH OF ARC.	ANGLE AT INTERSECTION OF TANGENTS.		LENGTHS ROUND ARCS, WITH OFFSETS (O) THERETO FROM DISTANCES (D) ON TANGENTS.													
			LENGTHS BACK ARC FROM CENTRE-POINT OF ARC.						INTERSECTION OF TANGENTS.	LENGTHS FORWARD ARC FROM CENTRE-POINT OF ARC.						
			500	400	300	200	100	0		0	100	200	300	400	500	600
200	11° 34′ 30″	D					0	99·83	100·3	0·51	100·3					
		O					0·00	5·05	**5·07**	5·05	0·00					
400	23° 8′ 59″	D				0	99·83	198·6	202·8	4·13	103	202·8				
		O				0·00	5·05	20·14	**20·56**	20·14	5·05	0·00				
600	34° 43′ 29″	D			0	99·83	198·6	295·4	309·5	14·10	110·9	209·7	309·5			
		O			0·00	5·05	20·14	45·11	**47·26**	45·11	20·14	5·05	0·00			
800	46° 17′ 58″	D		0	99·83	198·6	295·4	389·2	423·3	34·08	127·9	224·7	323·5	423·3		
		O		0·00	5·05	20·14	45·11	79·72	**86·70**	79·72	45·11	20·14	5·05	0·00		
1000	57° 52′ 28″	D	0	99·83	198·6	295·4	389·2	479	547·3	68·34	158·2	252	348·8	447·6	547·3	
		O	0·00	5·05	20·14	45·11	79·72	123·6	**141·2**	123·6	79·72	45·11	20·14	5·05	0·00	

TABLE CVII. RADIUS **1320.** (TANGENTS.)

(1320 Feet = 20 Imperial Chains.)

DEG. OF ELEMENT.	ANGLE AT INTERSECTION OF TANGENTS.		LENGTHS ROUND ARCS, WITH OFFSETS (O) THERETO FROM DISTANCES (D) ON TANGENTS.													
			LENGTHS BACK ARC FROM CENTRE-POINT OF ARC.						INTER-SECTION OF TAN-GENTS.	LENGTHS FORWARD ARC FROM CENTRE-POINT OF ARC.						
			500	400	300	200	100	0		0	100	200	300	400	500	600
00	8° 40′ 52″	D					0	99·90	100·2	0·30	100·2					
		O					0·00	3·79	**3·81**	3·79	0·00					
00	17° 21′ 44″	D				0	99·90	199·2	201·5	2·30	101·6	201·5				
		O				0·00	3·79	15·13	**15·30**	15·13	3·79	0·00				
00	26° 2′ 37″	D			0	99·90	199·2	297·4	305·3	7·85	106	205·4	305·3			
		O			0·00	3·79	15·13	33·95	**34·85**	33·95	15·13	3·79	0·00			
00	34° 43′ 29″	D		0	99·90	199·2	297·4	393·9	412·7	18·80	115·3	213·5	312·8	412·7		
		O		0·00	3·79	15·13	33·95	60·15	**63·02**	60·15	33·95	15·13	3·79	0·00		
00	43° 24′ 21″	D	0	99·90	199·2	297·4	393·9	488·1	525·4	37·26	131·5	228	326·2	425·5	525·4	
		O	0·00	3·79	15·13	33·95	60·15	93·58	**100·7**	93·58	60·15	33·95	15·13	3·79	0·00	
00	52° 5′ 13″	D	99·90	199·2	297·4	393·9	488·1	579·5	645	65·48	156·9	251·1	347·6	445·8	545·1	645
		O	3·79	15·13	33·95	60·15	93·58	134	**149·1**	134	93·58	60·15	33·95	15·13	3·79	0·00

TABLE CVIII. RADIUS 1650. (TANGENTS.)

(1650 Feet = 25 Imperial Chains.)

LENGTH OF ARC.	ANGLE AT INTERSECTION OF TANGENTS.		LENGTHS ROUND ARCS, WITH OFFSETS (O) THERETO FROM DISTANCES (D) ON TANGENTS.													
			LENGTHS BACK ARC FROM CENTRE-POINT OF ARC.						INTERSECTION OF TANGENTS.	LENGTHS FORWARD ARC FROM CENTRE-POINT OF ARC.						
			500	400	300	200	100	0		0	100	200	300	400	500	600
200	6° 56′ 42″	D					0	99·94	100·1	0·18	100·1					
		O					0·00	3·03	**3·04**	3·03	0·00					
400	13° 53′ 23″	D				0	99·94	199·5	201	1·48	101	201				
		O				0·00	3·03	12·11	**12·20**	12·11	3·03	0·00				
600	20° 50′ 5″	D			0	99·94	199·5	298·3	303·3	5	103·8	203·4	303·3			
		O			0·00	3·03	12·11	27·20	**27·65**	27·20	12·11	3·03	0·00			
800	27° 46′ 47″	D		0	99·94	199·5	298·3	396·1	408	11·93	109·6	208·5	308	408		
		O		0·00	3·03	12·11	27·20	48·25	**49·70**	48·25	27·20	12·11	3·03	0·00		
000	34° 43′ 29″	D	0	99·94	199·5	298·3	396·1	492·4	515·9	23·50	119·8	217·5	316·4	415·9	515·9	
		O	0·00	3·03	12·11	27·20	48·25	75·18	**78·77**	75·18	48·25	27·20	12·11	3·03	0·00	
200	41° 40′ 10″	D	99·94	199·5	298·3	396·1	492·4	586·9	627·9	41·05	135·5	231·8	329·6	428·4	528	627·9
		O	3·03	12·11	27·20	48·25	75·18	107·9	**115·4**	107·9	75·18	48·25	27·20	12·11	3·03	0·00

TABLE CIX. RADIUS 1980. (TANGENTS.)

(1980 Feet = 30 Imperial Chains.)

CHAIN OR LENGTH	ANGLE AT INTERSECTION OF TANGENTS.		LENGTHS ROUND ARCS, WITH OFFSETS (O) THERETO FROM DISTANCES (D) ON TANGENTS.													
			LENGTHS BACK ARC FROM CENTRE-POINT OF ARC.						INTERSECTION OF TANGENTS.	LENGTHS FORWARD ARC FROM CENTRE-POINT OF ARC.						
			500	400	300	200	100	0		0	100	200	300	400	500	600
200	5° 47′ 15″	D					0	99·96	100·1	0·13	100·1					
		O					0·00	2·52	**2·53**	2·52	0·00					
400	11° 34′ 30″	D				0	99·96	199·7	200·7	1·02	100·7	200·7				
		O				0·00	2·52	10·09	**10·14**	10·09	2·52	0·00				
600	17° 21′ 44″	D			0	99·96	199·7	298·8	302·3	3·46	102·6	202·4	302·3			
		O			0·00	2·52	10·09	22·68	**22·94**	22·68	10·09	2·52	0·00			
	23° 8′ 59″	D		0	99·96	199·7	298·8	397·3	405·5	8·25	106·7	205·9	305·6	405·5		
		O		0·00	2·52	10·09	22·68	40·26	**41·10**	40·26	22·68	10·09	2·52	0·00		
1000	28° 56′ 14″	D	0	99·96	199·7	298·8	397·3	494·7	510·9	16·20	113·6	212·1	311·2	410·9	510·9	
		O	0·00	2·52	10·09	22·68	40·26	62·79	**64·85**	62·79	40·26	22·68	10·09	2·52	0·00	
1200	34° 43′ 29″	D	99·96	199·7	298·8	397·3	494·7	590·8	619	28·20	124·3	221·8	320·2	419·4	519·1	619
		O	2·52	10·09	22·68	40·26	62·79	90·21	**94·52**	90·21	62·79	40·26	22·68	10·09	2·52	0·00

TABLE CX. RADIUS 2310. (TANGENTS.)

(2310 Feet = 35 Imperial Chains.)

LENGTH OF ARC.	ANGLE AT INTERSECTION OF TANGENTS.		LENGTHS ROUND ARCS, WITH OFFSETS (O) THERETO FROM DISTANCES (D) ON TANGENTS.													
			LENGTHS BACK ARC FROM CENTRE-POINT OF ARC.						INTERSECTION OF TANGENTS.	LENGTHS FORWARD ARC FROM CENTRE-POINT OF ARC.						
			500	400	300	200	100	0		0	100	200	300	400	500	600
200	4° 57′ 38″	D					0	99·97	100·1	0 09	100·1					
		O					0·00	2·16	**2·17**	2·16	0·00					
400	9° 55′ 17″	D				0	99·97	199·7	200·5	0·75	100·5	200·5				
		O				0·00	2·16	8·65	**8·68**	8·65	2·16	0·00				
600	14° 52′ 55″	D			0	99·97	199·7	299·2	301·7	2·54	102	201·7	301·7			
		O			0·00	2·16	8·65	19·45	**19·62**	19·45	8·65	2·16	0·00			
800	19° 50′ 34″	D		0	99·97	199·7	299·2	398	404	6·04	104·9	204·3	304·1	404		
		O		0·00	2·16	8·65	19·45	34·54	**35·06**	34·54	19·45	8·65	2·16	0·00		
1000	24° 48′ 12″	D	0	99·97	199·7	299·2	398	496·1	508	11·85	110	208·8	308·2	408	508	
		O	0·00	2·16	8·65	19·45	34·54	53·90	**55·19**	53·90	34·54	19·45	8·65	2·16	0·00	
1200	29° 45′ 50″	D	99·97	199·7	299·2	398	496·1	593·3	613·9	20·59	117·8	215·9	314·7	414·1	513·9	613·9
		O	2·16	8·65	19·45	34·54	53·90	77·48	**80·17**	77·48	53·90	34·54	19·45	8·65	2·16	0·00

TABLE CXI. RADIUS 2640. (TANGENTS.)

(2640 Feet = 40 Imperial Chains.)

LENGTH OF ARC.	ANGLE AT INTERSECTION OF TANGENTS.		LENGTHS ROUND ARCS, WITH OFFSETS (O) THERETO FROM DISTANCES (D) ON TANGENTS.													
			LENGTHS BACK ARC FROM CENTRE-POINT OF ARC.						INTERSECTION OF TANGENTS.	LENGTHS FORWARD ARC FROM CENTRE-POINT OF ARC.						
			500	400	300	200	100	0		0	100	200	300	400	500	600
200	4° 20′ 26″	D					0	99·97	100	0·07	100					
		O					0·00	1·89	1·90	1·89	0·00					
400	8° 40′ 52″	D				0	99·97	199·8	200·4	0·57	100·4	200·4				
		O				0·00	1·89	7·57	7·59	7·57	1·89	0·00				
600	13° 1′ 18″	D			0	99·97	199·8	299·3	301·3	1·94	101·5	201·3	301·3			
		O			0·00	1·89	7·57	17·03	17·14	17·03	7·57	1·89	0·00			
800	17° 21′ 44″	D		0	99·97	199·8	299·3	398·5	403·1	4·62	103·7	203·3	303·1	403·1		
		O		0·00	1·89	7·57	17·03	30·24	30·59	30·24	17·03	7·57	1·89	0·00		
1000	21° 42′ 10″	D	0	99·97	199·8	299·3	398·5	497	506·1	9·05	107·6	206·7	306·3	406·1	506·1	
		O	0·00	1·89	7·57	17·03	30·24	47·20	48·06	47·20	30·24	17·03	7·57	1·89	0·00	
1200	26° 2′ 37″	D	99·97	199·8	299·3	398·5	497	594·8	610·5	15·70	113·5	212	311·2	410·7	510·5	610·5
		O	1·89	7·57	17·03	30·24	47·20	67·88	69·67	67·88	47·20	30·24	17·03	7·57	1·89	0·00

TABLE CXII. RADIUS **2970**. (TANGENTS.)

(2970 Feet = 45 Imperial Chains.)

LENGTH OF ARC.	ANGLE AT INTERSECTION OF TANGENTS.		LENGTHS ROUND ARCS, WITH OFFSETS (O) THERETO FROM DISTANCES (D) ON TANGENTS.													
			LENGTHS BACK ARC FROM CENTRE-POINT OF ARC.						INTERSECTION OF TANGENTS.	LENGTHS FORWARD ARC FROM CENTRE-POINT OF ARC.						
			500	400	300	200	100	0		0	100	200.	300	400	500	600
00	3° 51′ 30″	D					0	99·98	100	0·06	100					
		O					0·00	1·68	**1·68**	1·68	0·00					
00	7° 43′ 0″	D				0	99·98	199·9	200·3	0·45	100·3	200·3				
		O				0·00	1·68	6·73	**6·75**	6·73	1·68	0·00				
00	11° 34′ 30″	D			0	99·98	199·9	299·5	301	1·53	101·2	201	301			
		O			0·00	1·68	6·73	15·14	**15·22**	15·14	6·73	1·68	0·00			
00	15° 25′ 59″	D		0	99·98	199·9	299·5	398·8	402·4	3·64	102·9	202·6	302·5	402·4		
		O		0·00	1·68	6·73	15·14	26·90	**27·15**	26·90	15·14	6·73	1·68	0·00		
00	19° 17′ 29″	D	0	99·98	199·9	299·5	398·8	497·6	504·8	7·14	106	205·3	304·9	404·8	504·8	
		O	0·00	1·68	6·73	15·14	26·90	41·99	**42·59**	41·99	26·90	15·14	6·73	1·68	0·00	
00	23° 8′ 59″	D	99·98	199·9	299·5	398·8	497·6	595·9	608·3	12·37	110·7	209·5	308·8	408·4	508·3	608·3
		O	1·68	6·73	15·14	26·90	41·99	60·40	**61·65**	60·40	41·99	26·90	15·14	6·73	1·68	0·00

TABLE CXIII.

RADIUS 3300.

(3300 Feet = 50 Imperial Chains.)

(TANGENTS.)

LENGTH OF ARC.	ANGLE AT INTERSECTION OF TANGENTS.		LENGTHS ROUND ARCS, WITH OFFSETS (O) THERETO FROM DISTANCES (D) ON TANGENTS.													
			LENGTHS BACK ARC FROM CENTRE-POINT OF ARC.						INTERSECTION OF TANGENTS.	LENGTHS FORWARD ARC FROM CENTRE-POINT OF ARC.						
			500	400	300	200	100	0		0	100	200	300	400	500	600
200	3° 28′ 21″	D					0	99·98	100	0·05	100					
		O					0·00	1·51	1·51	1·51	0·00					
400	6° 56′ 42″	D				0	99·98	199·9	200·2	0·37	100·3	200·2				
		O				0·00	1·51	6·05	6·06	6·05	1·51	0·00				
	10° 25′ 3″	D			0	99·98	199·9	299·6	300·8	1·24	101	200·8	300·8			
		O			0·00	1·51	6·05	13·62	13·68	13·62	6·05	1·51	0·00			
	13° 53′ 23″	D		0	99·98	199·9	299·6	399	402	2·95	102·4	202·1	302	402		
		O		0·00	1·51	6·05	13·62	24·21	24·39	24·21	13·62	6·05	1·51	0·00		
000	17° 21′ 44″	D	0	99·98	199·9	299·6	399	498·1	503·9	5·77	104·8	204·3	304	403·9	503·9	
		O	0·00	1·51	6·05	13·62	24·21	37·80	38·24	37·80	24·21	13·62	6·05	1·51	0·00	
1200	20° 50′ 5″	D	99·98	199·9	299·6	399	498·1	596·7	606·7	10	108·6	207·7	307·1	406·8	506·7	606·7
		O	1·51	6·05	13·62	24·21	37·80	54·39	55·30	54·39	37·80	24·21	13·62	6·05	1·51	0·00

TABLE CXIV. RADIUS 3630. (TANGENTS.)

(3630 Feet = 55 Imperial Chains.)

LENGTH OF ARC.	ANGLE AT INTERSECTION OF TANGENTS.		LENGTHS ROUND ARCS, WITH OFFSETS (O) THERETO FROM DISTANCES (D) ON TANGENTS.													
			LENGTHS BACK ARC FROM CENTRE-POINT OF ARC.						INTERSECTION OF TANGENTS.	LENGTHS FORWARD ARC FROM CENTRE-POINT OF ARC.						
			500	400	300	200	100	0		0	100	200	300	400	500	600
00	3° 9′ 24″	D					0	99·99	100	0·04	100					
		O					0·00	1·38	**1·38**	1·38	0·00					
00	6° 18′ 49″	D				0	99·99	199·9	200·2	0·30	100·2	200·2				
		O				0·00	1·38	*5·51*	**5·52**	*5·51*	1·38	0·00				
00	9° 28′ 13″	D			0	99·99	199·9	299·7	300·7	1·03	100·8	200·7	300·7			
		O			0·00	1·38	*5·51*	12·39	**12·43**	12·39	*5·51*	1·38	0·00			
00	12° 37′ 38″	D		0	99·99	199·9	299·7	399·2	401·6	2·44	102	201·7	301·6	401·6		
		O		0·00	1·38	*5·51*	12·39	22·02	**22·15**	22·02	12·39	*5·51*	1·38	0·00		
00	15° 47′ 2″	D	0	99·99	199·9	299·7	399·2	498·4	503·2	4·77	104	203·5	303·3	403·2	503·2	
		O	0·00	1·38	*5·51*	12·39	22·02	34·38	**34·71**	34·38	22·02	12·39	*5·51*	1·38	0·00	
00	18° 56′ 27″	D	99·99	199·9	299·7	399·2	498·4	597·3	605·5	8·25	107·1	206·3	305·9	405·6	*505·5*	605·5
		O	1·38	*5·51*	12·39	22·02	34·38	49·47	**50·15**	49·47	34·38	22·02	12·39	*5·51*	1·38	0.00

TABLE CXV. RADIUS **3960.** (TANGENTS.)

(3960 Feet = 60 Imperial Chains.)

LENGTH OF ARC.	ANGLE AT INTERSECTION OF TANGENTS.		LENGTHS ROUND ARCS, WITH OFFSETS (O) THERETO FROM DISTANCES (D) ON TANGENTS.													
			LENGTHS BACK ARC FROM CENTRE-POINT OF ARC.						INTERSECTION OF TANGENTS.	LENGTHS FORWARD ARC FROM CENTRE-POINT OF ARC.						
			500	400	300	200	100	0		0	100	200	300	400	500	600
200	2° 53′ 37″	D					0	99·99	100	0·03	100					
		O					0·00	1·26	**1·26**	1·26	0·00					
100	5° 47′ 15″	D				0	99·99	199·9	200·2	0·25	100·2	200·2				
		O				0·00	1·26	5·04	**5·05**	5·04	1·26	0·00				
)	8° 40′ 52″	D			0	99·99	199·9	299·7	300·6	0·86	100·7	200·6	300·6			
		O			0·00	1·26	5·04	11·36	**11·39**	11·36	5·04	1·26	0·00			
)	11° 34′ 30″	D		0	99·99	199·9	299·7	399·3	401·4	2·05	101·7	201·5	301·4	401·4		
		O		0·00	1·26	5·04	11·36	20·19	**20·29**	20·19	11·36	5·04	1·26	0·00		
	14° 28′ 7″	D	0	99·99	199·9	299·7	399·3	498·7	502·7	4·00	103·4	203	302·8	402·7	502·7	
		O	0·00	1·26	5·04	11·36	20·19	31·53	**31·78**	31·53	20·19	11·36	5·04	1·26	0·00	
200	17° 21′ 44″	D	99·99	199·9	299·7	399·3	498·7	597·7	604·6	6·93	106	205·3	304·9	404·7	504·6	604·6
		O	1·26	5·04	11·36	20·19	31·53	45·37	**45·90**	45·37	31·53	20·19	11·36	5·04	1·26	0·00

TABLE CXVI. RADIUS **4290.** (TANGENTS.)

(4290 Feet = 65 Imperial Chains.)

LENGTH OF ARC.	ANGLE AT INTERSECTION OF TANGENTS.		LENGTHS ROUND ARCS, WITH OFFSETS (O) THERETO FROM DISTANCES (D) ON TANGENTS.													
			LENGTHS BACK ARC FROM CENTRE-POINT OF ARC.						INTERSECTION OF TANGENTS.	LENGTHS FORWARD ARC FROM CENTRE-POINT OF ARC.						
			500	400	300	200	100	0		0	100	200	300	400	500	600
200	2° 40′ 16″	D					0	99·99	100	0·03	100					
		O					0·00	1·16	**1·16**	1·16	0·00					
400	5° 20′ 32″	D				0	99·99	199·9	200·1	0·22	100·1	200·1				
		O				0·00	1·16	4·65	**4·66**	4·65	1·16	0·00				
600	8° 0′ 48″	D			0	99·99	199·9	299·8	300·5	0·73	100·6	200·5	300·5			
		O			0·00	1·16	4·65	10·47	**10·50**	10·47	4·65	1·16	0·00			
800	10° 41′ 4″	D		0	99·99	199·9	299·8	399·4	401·2	1·74	101·4	201·2	301·2	401·2		
		O		0·00	1·16	4·65	10·47	18·62	**18·70**	18·62	10·47	4·65	1·16	0·00		
000	13° 21′ 20″	D	0	99·99	199·9	299·8	399·4	498·9	502·3	3·41	102·9	202·5	302·4	402·3	502·3	
		O	0·00	1·16	4·65	10·47	18·62	29·09	**29·29**	29·09	18·62	10·47	4·65	1·16	0·00	
200	16° 1′ 36″	D	99·99	199·9	299·8	399·4	498·9	598	603·9	5·90	105·1	204·5	304·2	404	504	603·9
		O	1·16	4·65	10·47	18·62	29·09	41·87	**42·28**	41·87	29·09	18·62	10·47	4·65	1·16	0·00

TABLE CXVII. RADIUS 4620. (TANGENTS.)

(4620 Feet 70 Imperial Chains.)

LENGTH OF ARC.	ANGLE AT INTERSECTION OF TANGENTS.		LENGTHS ROUND ARCS, WITH OFFSETS (O) THERETO FROM DISTANCES (D) ON TANGENTS.														
			LENGTHS BACK ARC FROM CENTRE-POINT OF ARC.						INTERSECTION OF TANGENTS.	LENGTHS FORWARD ARC FROM CENTRE-POINT OF ARC.							
			500	400	300	200	100	0		0	100	200	300	400	500	600
200	2° 28′ 49″	D					0	99·99	100	0·03	100					
		O					0·00	1·08	1·08	1·08	0·00					
400	4° 57′ 38″	D				0	99·99	199·9	200·1	0·19	100·1	200·1				
		O				0·00	1·08	4·33	4·33	4·33	1·08	0·00				
600	7° 26′ 28″	D			0	99·99	199·9	299·8	300·4	0·63	100·5	200·4	300·4			
		O			0·00	1·08	4·33	9·74	9·76	9·74	4·33	1·08	0·00			
800	9° 55′ 17″	D		0	99·99	199·9	299·8	399·5	401	1·50	101·2	201·1	301	401		
		O		0·00	1·08	4·33	9·74	17·31	17·38	17·31	9·74	4·33	1·08	0·00		
1000	12° 24′ 6″	D	0	99·99	199·9	299·8	399·5	499	502	2·94	102·5	202·2	302	402	502	
		O	0·00	1·08	4·33	9·74	17·31	27·03	27·19	27·03	17·31	9·74	4·33	1·08	0·00	
1200	14° 52′ 55″	D	99·99	199·9	299·8	399·5	499	598·3	603·4	5·08	104·4	203·9	303·6	403·5	503·4	603·4
		O	1·08	4·33	9·74	17·31	27·03	38·91	39·24	38·91	27·03	17·31	9·74	4·33	1·08	0·00

TABLE CXVIII. RADIUS 4950. (TANGENTS.)

(4950 Feet = 75 Imperial Chains.)

LENGTH OF ARC.	ANGLE AT INTERSECTION OF TANGENTS.		LENGTHS ROUND ARCS, WITH OFFSETS (O) THERETO FROM DISTANCES (D) ON TANGENTS.												
			LENGTHS BACK ARC FROM CENTRE-POINT OF ARC.						INTERSECTION OF TANGENTS.	LENGTHS FORWARD ARC FROM CENTRE-POINT OF ARC.					
			500	400	300	200	100	0		0	100	200	300	400	500	600
00	2° 18′ 54″	D					0	99·99	100	0·02	100					
		O					0·00	1·01	**1·01**	1·01	0·00					
00	4° 37′ 48″	D				0	99·99	199·9	200·1	0·16	100·1	200·1				
		O				0·00	1·01	4·04	**4·04**	4·04	1·01	0·00				
00	6° 56′ 42″	D			0	99·99	199·9	299·8	300·4	0·57	100·4	200·4	300·4			
		O			0·00	1·01	4·04	9·09	**9·10**	9·09	4·04	1·01	0·00			
00	9° 15′ 36″	D		0	99·99	199·9	299·8	399·6	400·9	1·30	101·1	200·9	300·9	400·9		
		O		0·00	1·01	4·04	9·09	16·16	**16·21**	16·16	9·09	4·04	1·01	0·00		
00	11° 34′ 30″	D	0	99·99	199·9	299·8	399·6	499·1	501·7	2·57	102·1	201·9	301·8	401·7	501·7	
		O	0·00	1·01	4·04	9·09	16·16	25·24	**25·37**	25·24	16·16	9·09	4·04	1·01	0·00	
00	13° 53′ 24″	D	99·99	199·9	299·8	399·6	499·1	598·5	603	4·43	103·8	203·4	303·1	403	503	603
		O	1·01	4·04	9·09	16·16	25·24	36·33	**36·60**	36·33	25·24	16·16	9·09	4·04	1·01	0·00

TABLE CXI. RADIUS **2640**. (TANGENTS.)

(2640 Feet = 40 Imperial Chains.)

ARC OF 1 LENGTH	ANGLE AT INTERSECTION OF TANGENTS.		LENGTHS ROUND ARCS, WITH OFFSETS (O) THERETO FROM DISTANCES (D) ON TANGENTS.													
			LENGTHS BACK ARC FROM CENTRE-POINT OF ARC.						INTERSECTION OF TANGENTS.	LENGTHS FORWARD ARC FROM CENTRE-POINT OF ARC.						
			500	400	300	200	100	0		0	100	200	300	400	500	600
00	4° 20′ 26″	D					0	99·97	100	0·07	100					
		O					0·00	1·89	**1·90**	1·89	0·00					
00	8° 40′ 52″	D				0	99·97	199·8	200·4	0·57	100·4	200·4				
		O				0·00	1·89	7·57	**7·59**	7·57	1·89	0·00				
00	13° 1′ 18″	D			0	99·97	199·8	299·3	301·3	1·94	101·5	201·3	301·3			
		O			0·00	1·89	7·57	17·03	**17·14**	17·03	7·57	1·89	0·00			
00	17° 21′ 44″	D		0	99·97	199·8	299·3	398·5	403·1	4·62	103·7	203·3	303·1	403·1		
		O		0·00	1·89	7·57	17·03	30·24	**30·59**	30·24	17·03	7·57	1·89	0·00		
00	21° 42′ 10″	D	0	99·97	199·8	299·3	398·5	497	506·1	9·05	107·6	206·7	306·3	406·1	506·1	
		O	0·00	1·89	7·57	17·03	30·24	47·20	**48·06**	47·20	30·24	17·03	7·57	1·89	0·00	
00	26° 2′ 37″	D	99·97	199·8	299·3	398·5	497	594·8	610·5	15·70	113·5	212	311·2	410·7	510·5	610·5
		O	1·89	7·57	17·03	30·24	47·20	67·88	**69·67**	67·88	47·20	30·24	17·03	7·57	1·89	0·00

TABLE CXX. RADIUS 6600. (TANGENTS.)

(6600 Feet = 100 Imperial Chains.)

LENGTH OF ARC.	ANGLE AT INTERSECTION OF TANGENTS.		LENGTHS ROUND ARCS, WITH OFFSETS (O) THERETO FROM DISTANCES (D) ON TANGENTS.													
			LENGTHS BACK ARC FROM CENTRE-POINT OF ARC.						INTERSECTION OF TANGENTS.	LENGTHS FORWARD ARC FROM CENTRE-POINT OF ARC.						
			500	400	300	200	100	0		0	100	200	300	400	500	600
200	1° 44′ 10″	D					0	100	100	0·01	100					
		O					0·00	0·76	**0·76**	0·76	0·00					
400	3° 28′ 21″	D				0	100	200	200·1	0·09	100·1	200·1				
		O				0·00	0·76	3·03	**3·03**	3·03	0·76	0·00				
600	5° 12′ 31″	D			0	100	200	299·9	300·2	0·33	100·3	200·2	300·2			
		O			0·00	0·76	3·03	6·82	**6·83**	6·82	3·03	0·76	0·00			
800	6° 56′ 42″	D		0	100	200	299·9	399·8	400·5	0·74	100·6	200·5	300·5	400·5		
		O		0·00	0·76	3·03	6·82	12·12	**12·14**	12·12	6·82	3·03	0·76	0·00		
	8° 40′ 52″	D	0	100	200	299·9	399·8	499·5	501	1·44	101·2	201·1	301	401	501	
		O	0·00	0·76	3·03	6·82	12·12	18·94	**19·00**	18·94	12·12	6·82	3·03	0·76	0·00	
200	10° 25′ 3″	D	100	200	299·9	399·8	499·5	599·2	601·7	2·49	102·1	201·9	301·8	401·7	501·7	601·7
		O	0·76	3·03	6·82	12·12	18·94	27·27	**27·38**	27·27	18·94	12·12	6·82	3·03	0·76	0·00

TABLE CXXI. RADIUS 7920. (TANGENTS.)

(7920 Feet = 120 Imperial Chains.)

LENGTH OF ARC.	ANGLE AT INTERSECTION OF TANGENTS.		LENGTHS ROUND ARCS, WITH OFFSETS (O) THERETO FROM DISTANCES (D) ON TANGENTS.													
			LENGTHS BACK ARC FROM CENTRE-POINT OF ARC.						INTERSECTION OF TANGENTS.	LENGTHS FORWARD ARC FROM CENTRE-POINT OF ARC.						
1			500	400	300	200	100	0		0	100	200	300	400	500	600
200	1° 26′ 49″	D					0	100	100	0·01	100					
		O					0·00	0·63	0·63	0·63	0·00					
400	2° 53′ 37″	D				0	100	200	200	0·06	100	200				
		O				0·00	0·63	2·52	2·52	2·52	0·63	0·00				
600	4° 20′ 26″	D			0	100	200	299·9	300·1	0·21	100·2	200·1	300·1			
		O			0·00	0·63	2·52	5·67	5·67	5·67	2·52	0·63	0·00			
800	5° 47′ 15″	D		0	100	200	299·9	399·8	400·3	0·51	100·4	200·4	300·3	400·3		
		O		0·00	0·63	2·52	5·67	10·08	10·09	10·08	5·67	2·52	0·63	0·00		
1000	7° 14′ 4″	D	0	100	200	299·9	399·8	499·7	500·7	1·00	100·8	200·8	300·7	400·7	500·7	
		O	0·00	0·63	2·52	5·67	10·08	15·76	15·79	15·76	10·08	5·67	2·52	0·63	0·00	
1200	8° 40′ 52″	D	100	200	299·9	399·8	499·7	599·4	601·1	1·72	101·5	201·3	301·2	401·2	501·1	601·1
		O	0·63	2·52	5·67	10·08	15·76	22·70	22·77	22·70	15·76	10·08	5·67	2·52	0·63	0·00